

**HONG
KONG
2006**



June 25-28, 2006
Sheraton Hotel & Towers Hong Kong
and Holiday Inn Golden Mile
Hong Kong, China

INFORMS
International

In conjunction with

**The Hong Kong Operational Research Society
and The Operations Research Society of China**



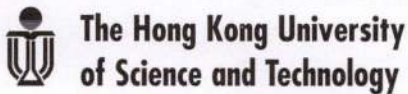
Table of Contents

THANKS TO OUR SPONSORS



The Croucher Foundation

The K.C. Wong Education Foundation



Hong Kong 2006 Committee	2
Welcome from the General Chair	3
Program at a Glance	4
Speaker Information	5
Guest Tours & Plant Tours	7
Networking & Social Events	8
Exhibits	9
Plenary Presentations	10
Invited & Sponsored Cluster Chairs	12
INFORMS Future Meetings	14
Hotel Floor Plans	15
Technical Sessions	
Sunday	17
Monday	36
Tuesday	64
Wednesday	91
Session Chair Index	123
Author Index	125
Session Index	133
Master Track Schedule	136 & Inside Back Cover

Copies of papers abstracted in the meeting program are available only from the authors. Requests for papers should be sent to the authors at the addresses shown in the program. Individual issues of the program are available for \$20US per copy. Orders must be prepaid and sent to INFORMS, P.O. Box 631704, Baltimore, MD 21263-1704.



Hong Kong 2006 Committee

ORGANIZING COMMITTEE

General Chair

Chung-Yee Lee, PhD
Head and Professor
Dept. of Industrial Engineering and Engineering
Management
Director, Logistics and Supply Chain Management
Institute
The Hong Kong University of Science and Technology
cylee@ust.hk

Program Chair

Rachel Zhang, PhD
Associate Professor
Dept. of Industrial Engineering & Engineering
Management
The Hong Kong University of Science and Technology
rzhang@ust.hk

Practitioner Program Chair

Grace Lin
IBM Business Consulting Services
gracelin@us.ibm.com

Sponsored Sessions Chair

Janny Leung
The Chinese University of Hong Kong
janny@se.cuhk.edu.hk

Contributed Sessions Chair

Albert Ha
The Hong Kong University of Science and
Technology
imayha@ust.hk

MEETING COMMITTEE

Ping-Teng Chang
Tunghai University
ptchang@ie.thu.edu.tw

Jian Chen
Tsinghua University
jchen@mail.tsinghua.edu.cn

Edwin Cheng
Hong Kong Polytechnic University
edwin.cheng@inet.polyu.edu.hk

Sydney C.K. Chu
Hong Kong University
schu@hkucc.hku.hk

Nesim Erkip
Bilkent University
nesim@bilkent.edu.tr

Jan C. Fransoo
Technische Universiteit Eindhoven
j.c.fransoo@tm.tue.nl

Boaz Golany
Technion-Israel Inst. of Technology
golany@ie.technion.ac.il

K. K. Lai
City University of Hong Kong
mskkklai@cityu.edu.hk

T.S. Lee
Chinese University of Hong Kong
tslee@cuhk.edu.hk

Lei Lei
Rutgers University
llel@andromeda.rutgers.edu

Ben Lev
University of Michigan-Dearborn
blev@umich.edu

Timothy J. Lowe
University of Iowa
timothy_lowe@uiowa.edu

Hirofumi Matsuo
Kobe University
matsuoh@kobe-u.ac.jp

Pricha Pantumsinchai
Chulalongkorn University
pricha@m-focus.co.th

Moshe Sniedovich
University of Melbourne
m.sniedovich@ms.unimelb.edu.au

Chang Sup Sung
Korea Advanced Inst. of Science and Technology
cssung@kaist.ac.kr

David M-C Wu
National Chiao Tung University
mcwu@cc.nctu.edu.tw

Soushan Wu
Chang Gung University
swu@mail.cgu.edu.tw

Candace A. Yano
University of California-Berkeley
yano@queue.ieor.berkeley.edu

Hanqin Zhang
Chinese Academy of Sciences
hanqin@amt.ac.cn



Welcome from the General Chair

工業工程及物流管理學系
Department of Industrial
Engineering and Logistics
Management



香港科技大學
HONG KONG
UNIVERSITY OF
SCIENCE &
TECHNOLOGY

香港九龍清水灣
Clear Water Bay,
Kowloon,
Hong Kong

電話 Tel: (852) 2358 7092
傳真 Fax: (852) 2335 1753

Dear Colleagues and Friends,

It is my great pleasure to welcome you to INFORMS International Conference HK 2006 and to the beautiful city of life – Hong Kong. This year is the first time INFORMS has been held in Hong Kong. INFORMS has grown substantially in the past decade and firmly established itself as a leading international platform for research in operations research and the management sciences.

This year's INFORMS HK has had an overwhelming response, with more than 1,200 submissions. This conference comprises a broad area of OR/MS applications, and I would like to take this opportunity to thank the Organizing Committee members – Albert Ha, Janny Leung, Grace Lin and Rachel Zhang for their hard work in reviewing and grouping the submitted papers and dedication to putting together the great program for the conference. I would also like to thank Gloria Wong for her outstanding work in making all local arrangements. Thanks especially to all of the authors for submitting their papers to INFORMS HK; without your contributions and participation, the conference could not evolve into the successful event it promises to be. We are also offering a diverse set of interesting plenary and keynote sessions, different receptions and plant tours. For the latter, our participants have an unprecedented chance to explore the infrastructures of the world's largest container throughput and second largest air cargo volume. I hope that you are able to participate in and take advantage of this great opportunity.

I wish to acknowledge the following individuals who have contributed a great deal to our conference. Special thanks to the Plenary Speakers – Hau Lee, Marshall Fisher and Ya-xiang Yuan for their valuable time. Thanks to the Meeting Committee members, Cluster Chairs and Session Chairs; without their substantial promotion of and contribution to this conference, it would not be such a success. Thanks also to the INFORMS office – Mark Daskin (President), Rina Schneur (V.P. of Meetings) and her team, Mark Doherty, Terry Cryan and her team, for their invaluable assistance throughout the process of planning and putting together the conference. I applaud all of you.

Finally, I would like to express my gratitude to the following leading companies, foundations and institute, who so generously gave their support to INFORMS HK: IBM Business Consulting Services, The Croucher Foundation, The K.C. Wong Education Foundation, ILOG, and the Hong Kong University of Science and Technology.

Again, welcome to Hong Kong, a vibrant city where wonders never cease. I hope that all of you can benefit from this well-organized conference and enjoy your time in Hong Kong.

Chung-Yee Lee

Program at a Glance

SATURDAY, JUNE 24

1:00pm-7:00pm Registration S – Floor 3

SUNDAY, JUNE 25

7:00am-6:30pm Registration S – Floor 3
 8:00am-9:30am Technical Sessions (SA) Sheraton, Holiday Inn
 9:30am-10:00am Refreshment Break S – Floor 3; H – Floor B3
 10:00am-11:30am Technical Sessions (SB) Sheraton, Holiday Inn
 11:45am-12:40pm Plenary: Professor Ya-xiang Yuan S – Ballroom, Floor 3
 12:40pm-1:30pm Lunch Break (on your own)
 1:30pm-3:00pm Technical Sessions (SC) Sheraton, Holiday Inn
 3:00pm-3:30pm Refreshment Break S – Fl. 3; H – Hari's Bar, Mezzanine
 3:00pm- 8:00pm Exhibits S – Floor 3
 3:30pm-5:00pm Technical Sessions (SD) Sheraton, Holiday Inn
 6:30pm-8:00pm Welcome Reception S – Ballroom, Floor 3

MONDAY, JUNE 26

7:00am-5:00pm Registration S – Floor 3
 8:00am-9:30am Technical Sessions (MA) Sheraton, Holiday Inn
 9:00am-5:00pm Exhibits S – Floor 3
 9:30am-10:00am Refreshment Break S – Fl. 3; H – Hari's Bar, Mezzanine
 10:00am-11:30am Technical Sessions (MB) Sheraton, Holiday Inn
 11:45am-12:40pm Plenary: Professor Hau Lee S – Ballroom, Floor 3
 12:40pm-1:30pm Lunch Break (on your own)
 1:30pm-3:00pm Technical Sessions (MC) Sheraton, Holiday Inn
 3:00pm-3:30pm Refreshment Break S – Fl. 3; H – Hari's Bar, Mezzanine
 3:30pm-5:00pm Technical Sessions (MD) Sheraton, Holiday Inn
 7:30pm-9:30pm General Reception S – Ballroom, Floor 3

TUESDAY, JUNE 27

7:00am-5:00pm Registration S – Floor 3
 8:00am-9:30am Technical Sessions (TA) Sheraton, Holiday Inn
 9:00am-5:00pm Exhibits S – Floor 3
 9:30am-10:00am Refreshment Break S – Floor 3; H – Avenue Rm., Floor 1
 10:00am-11:30am Technical Sessions (TB) Sheraton, Holiday Inn
 11:45am-12:40pm Plenary: Professor Marshall Fisher S – Ballroom, Floor 3
 12:40pm-1:30pm Lunch Break (on your own)
 1:30pm-3:00pm Technical Sessions (TC) Sheraton, Holiday Inn
 3:00pm-3:30pm Refreshment Break S – Fl. 3; H – Hari's Bar, Mezzanine
 3:30pm-5:00pm Technical Sessions (TD) Sheraton, Holiday Inn

WEDNESDAY, JUNE 28

Note: There are five technical session times on Wednesday.

7:00am-3:30pm Registration S – Floor 3
 8:00am-9:30am Technical Sessions (WA) Sheraton, Holiday Inn
 9:00am-3:30pm Exhibits S – Floor 3
 9:30am-10:00am Refreshment Break S – Fl. 3; H – Hari's Bar, Mezzanine
 10:00am-11:30am Technical Sessions (WB) Sheraton, Holiday Inn
 11:45am-1:15pm Technical Sessions (WC) Sheraton, Holiday Inn
 1:30pm-3:00pm Technical Sessions (WD) Sheraton, Holiday Inn
 3:00pm-3:30pm Refreshment Break S – Fl. 3; H – Hari's Bar, Mezzanine
 3:30pm-5:00pm Technical Sessions (WE) Sheraton, Holiday Inn

NOTE:

Technical sessions are held at the Sheraton Hong Kong and the Holiday Inn Golden Mile. For specific room locations, check the Master Track Schedule on page 136 & inside back cover, or the Technical Session abstracts beginning on page 17.

KEY

S – Sheraton
 H – Holiday Inn

INFORMS Hong Kong 2006 QUICK REFERENCE including the Master Track Schedule

Don't miss this handy reference. It's a separate flier that came with your program. The Master Track Schedule is also printed on page 136 & inside back cover.

BADGES REQUIRED FOR TECHNICAL SESSIONS

INFORMS Hong Kong 2006 badges must be worn to all sessions and events. Badges will be checked at the entrance to technical session areas. Attendees without badges will be directed to the INFORMS registration desk to register and pick up their badges. *All attendees, including speakers and session chairs, must register and pay the registration fee.* Lost badges can be replaced at the registration desk.

Speaker Information

SPEAKER GUIDELINES

Audio/Visual Equipment

Every room will be equipped with an LCD (data) projector. Only a limited supply of overhead projectors will be available. Speakers were asked to reserve an overhead projector in advance if they required an overhead. If you did not reserve in advance, but wish to use an overhead, please go to the INFORMS registration desk to check on availability.

Please follow these guidelines to ensure a successful presentation using the LCD projector:

- Bring your laptop PC to your session. We supply the projector, but we DO NOT supply the computer.
- Bring an adaptor to connect to the local voltage of 220 volts AC. The electrical outlets in the two hotels take a three-pronged plug.
- Bring your laptop's power adaptor with you. Do not attempt to run your presentation off the laptop battery.
- Produce and bring overhead transparencies as a backup.
- Arrive at your session at least 1/2 hour before it begins. All presenters in a session should set up and test the connection to the projector before the session begins.

Speaker Ready Room

A Speaker Ready Room (Sheraton—Floor 3) is available for you to practice connecting your laptop to the LCD projector. Technical assistance will also be available during the technical sessions for any problems. The Speaker Ready Room will be open during the following hours:

Sunday	7:00am-5:00pm	Monday	7:00am-5:00pm
Tuesday	7:00am-5:00pm	Wednesday	7:00am-3:30pm

Presentation Guidelines

The room and location of your session are listed in the Technical Sessions section and in the Master Track Schedule. Please be on time for your session and check in with the Session Chair. Presentations should be limited to key issues with a brief summary. Time your presentation to fit within your designated time span and leave an opportunity for questions. Bring copies of your paper to distribute or provide a handout with information relating to your oral presentation. INFORMS does not produce proceedings with complete papers. To obtain complete copies of any papers abstracted in the program, please contact the authors directly at the addresses supplied with each abstract.

For Assistance During Your Session: Session Monitor Desks

Session Monitor Desks are located in several locations in both the Sheraton and Holiday Inn (see the hotel maps for specific locations). Students from the Hong Kong University of Science and Technology staff these desks. If you have a problem in your session room (related to AV needs or any other requests), go to the Session Monitor Desk in the area to ask for assistance.

For Questions about the Program: Program Information Desks

If you have general questions about the meeting program and/or questions about your own presentation, go to one of the Program Information Desks (Sheraton—Floor 3; Holiday Inn—Floor B3). We also ask Session Chairs to notify the person at the Program Information Desk about any last-minute changes or cancellations in their sessions (these changes will be posted outside the meeting rooms). The Program Desks will be staffed by students from the Hong Kong University of Science and Technology.

SESSION CHAIR GUIDELINES

The role of the Chair is to coordinate the smooth running of the session.

The Chair:

- Begins and ends each session on time. Each session lasts 90 minutes, with the time per presentation determined by the number of papers in the session. Equal time should be given to each paper.
- Introduces each presentation (just the title of the paper and the name of the presenting author).
- Ensures that presentations are made in the order shown in the program. This allows for "session jumping." If a speaker cancels or does not attend, the original time schedule should be adhered to rather than sliding every talk forward
- Completes the session attendance forms (forms will be in the room).

REFRESHMENT BREAKS

Refreshment breaks are held in both hotels on the following schedule.

Sheraton Hotel

Sunday through Wednesday:

9:30am-10:00am	Floor 3
3:00pm-3:30pm	Floor 3

Holiday Inn

Sunday, 9:30am-10:00am	Crystal Ballroom A, Floor B3
Sunday, 3:00pm-3:30pm	Hari's Bar, Mezzanine

Monday, 9:30am-10:00am	Hari's Bar, Mezzanine
Monday, 3:00pm-3:30pm	Hari's Bar, Mezzanine

Tuesday, 9:30am-10:00am	Avenue Room, Floor 1
Tuesday, 3:00pm-3:30pm	Hari's Bar, Mezzanine

Wednesday, 9:30am-10:00am	Hari's Bar, Mezzanine
Wednesday, 3:00pm-3:30pm	Hari's Bar, Mezzanine

BADGES REQUIRED FOR TECHNICAL SESSIONS

INFORMS Hong Kong 2006 badges must be worn to all sessions and events. Badges will be checked at the entrance to technical session areas. Attendees without badges will be directed to the registration desk to pick up their badges and register. *All attendees, including speakers and session chairs, must register and pay the registration fee.* Lost badges can be replaced at the registration desk.

Speaker Information

GENERAL INFORMATION

Messages

The best way for people to reach you is to contact you directly at your hotel. Please leave your hotel phone number with your colleagues and family members. For urgent messages, call the Sheraton (852-2369-1111) and ask for the INFORMS Registration Desk. Registration staff will transcribe the message and post it on the message board located near registration. You can also contact colleagues attending the conference using this message board. Please check the message board periodically to see if you have received a message.

Exhibits

We invite you to stop by our exhibits center at the Sheraton (Floor 3) to see innovative software products and the latest in technical reference publications. Exhibits are open:

Sunday 3:00pm-8:00pm
Monday 9:00am-5:00pm
Tuesday 9:00am-5:00pm
Wednesday 9:00am-3:30pm

Registration

The registration fee includes admittance to all technical sessions, exhibits, refreshment breaks, the Welcome Reception on Sunday evening, and the General Reception on Monday evening. Meals other than these two events are not included. If your guest would like to accompany you to the receptions, a guest registration must be purchased for US\$75. The guest fee includes only the two receptions; guests are not eligible to attend the technical sessions.

EMAIL ACCESS & BUSINESS CENTER

There is no email access being provided by the conference. Please use the email and business center services provided by the two hotels.

Sheraton

The Sheraton Business Center offers Internet access at HK\$45 (US\$ 5.80) for the first 15 minutes, and HK\$3 (US\$.39) for every minute after that. Two complimentary B&W print-outs are included in the fee, as well as self-serve coffee and tea. The Center also provides fax, copying, equipment rental and other services. You can also rent private office and work station space.

Location: Floor 2

Hours: Monday – Friday: 7:30am – 11:30pm
Saturday, Sunday: 9:00am-5:00pm

For guests staying at the Sheraton, high-speed connection is available in your room at a rate of HK\$120 (US\$15.74) per day.

Holiday Inn

The Holiday Inn does not operate a business center. However, you can go to the hotel's front desk to request services. For guests staying at the Holiday Inn, high-speed connection is available in your room at a rate of HK\$116 (US\$14.95) per day.

Excellent Opportunities in Supply Chain Strategy Consulting

Be part of a multi-billion dollar company with a significant presence in APAC. Strategic supply chain professionals are needed to join this company's internal consulting team in their Singapore hub.

Dynamic Fortune 50 Company ◆ New Critical Positions

Your clients will be internal global product line and regional business managers. You will provide best-in-class analysis, modeling, and simulation to support key decisions in supply-chain network design, inventory management and related areas. You will leverage the 16+ years reputation and experience of the Americas and EMEA consulting groups, while being one of the key contributors in the new APAC team.

Successful candidates will have 4-5 years relevant experience in a strategy consulting firm or in a strategic supply chain capacity within a global MNC. An MBA from a top-tier business school or a Masters/Ph.D. in engineering, operations research, or related field is required. A self-motivated leader, you must be versatile and possess excellent communication, analysis, negotiation and interpersonal skills. The ability to build consensus with management and external parties is critical for success.

To apply for this position; send salary requirements and resume to Brian Cargille, APJ Manager, HP Strategic Planning and Modeling (brian.cargille@hp.com). Only short-listed candidates will receive replies.

HP is a technology company that operates in more than 170 countries around the world.

No other company offers as complete a technology product portfolio as HP; providing infrastructure and business offerings that span from handheld devices to some of the world's most powerful supercomputer installations. HP offers consumers a wide range of products and services from digital photography to digital entertainment and from computing to home printing.
www.hp.com



i n v e n t

Guest Tours & Plant Tours

GUEST REGISTRATION

The program for registered guests includes the Welcome Reception on Sunday evening and the General Reception on Monday evening. The guest fee is US\$75. A guest registration may be purchased at the registration desk. Registered guests will receive a colored name badge that must be worn for admittance to these events. Guests are not eligible to attend the technical sessions.

TOUR DESK FOR OTHER TOURS

In addition to the INFORMS tours described below, you can sign up for other Hong Kong area tours at the MV Destinations Tour Desk. The company will offer a full range of tours of all the Hong Kong attractions. The Tour Desk is located at the Sheraton, Floor 3 (next to Registration) and open at the following times:

Saturday 1:00pm-5:00pm
Sunday 9:00am-5:00pm
Monday 9:00am-5:00pm

INFORMS GUEST TOURS

You may still be able to purchase tickets for these special INFORMS guest tours. Go to the INFORMS registration desk for information on availability.

Buses for guest tours will leave at the beginning time listed for each tour, and will return to the Sheraton Hotel at the ending time listed. Buses for all tours depart from the Middle Road entrance of the Sheraton Hotel.

Hong Kong Island Tour

Sunday, June 25
8:30am-12:30pm US\$28

An excellent orientation tour of Hong Kong: the city changes so rapidly that it will refresh old memories and delight new visitors. Start with a tram ride to Victoria Peak for a panoramic view of the Hong Kong Island, Kowloon and the surrounding islands. Travel to picturesque Repulse Bay and then to the fishing village of Aberdeen, a "floating community," still very much a part of Hong Kong's cultural landscape. While there, you can join an optional sampan to get a close-up look of life on the water. Finally, enjoy shopping among the stalls of Stanley Market, where you can pick up bargains on both casual wear and designer items.

Lantau Island and Dolphin Watching Tour

Monday, June 26
9:00am-2:00pm US\$88 (Lunch Included)

Visitors joining this tour will have a unique opportunity to see Hong Kong's endangered pink dolphins in their scenic, natural habitat in and around the Sha Chau and Lung Kwu Chau Marine Park, on the western side of Hong Kong. The marine park has rich fisheries that provide important food for the pink dolphins (Indo-Pacific hump-backed dolphins). After dolphin-watching, lunch will be served at the Tai O fishing village at Lantau Island.

PLANT TOURS

The Hong Kong International Terminal tours are sold out. A limited number of openings may still be available for the Air Cargo Terminals tours. Go to the INFORMS registration desk for information on availability.

Buses for plant tours will leave at the beginning time listed for each tour, and will return to the Sheraton Hotel at the ending time listed. Buses for all tours depart from the Middle Road entrance of the Sheraton Hotel.

Hong Kong Air Cargo Terminals Ltd.

Tuesday 2:15pm-6:00pm US\$25
Wednesday 2:15pm-6:00pm US\$25

Hong Kong Air Cargo Terminals Limited (Hactl) is the world's leading international air cargo terminal operator. Located at Hong Kong International Airport, the world's busiest airport, Hactl has played a key role in enhancing Hong Kong's position as the international air cargo hub and gateway to China. Since starting operations in 1976, Hactl has invested in excess of US\$1 billion in SuperTerminal 1, creating a key infrastructure for the cargo community in Hong Kong. With around 70 percent of handled air cargo originating from or destined for China, Hactl is committed to further enhancing the connectivity between Hong Kong and the Pearl River Delta catchments area.

Hong Kong International Terminal

Tuesday 2:30pm-5:30pm SOLD OUT
Wednesday 2:30pm-5:30pm SOLD OUT

Hong Kong was ranked #1 in the world in 2004 in sea cargo volume throughput. Established in 1969, HIT has continuously set the industry standard for productivity, efficiency and value-added services. Using modern management techniques, state-of-the-art computer systems and award winning in-house IT applications, HIT has become the center of excellence for the group, Hutchison Port Holdings. HIT plays a key role in the continuing development of the port of Hong Kong, ensuring the port has the resources, facilities and people required to achieve smooth and efficient handling of container cargoes. HIT was a finalist in the 2004 Franz Edelman Award Competition.

REFRESHMENT BREAKS

Refreshment breaks are held in both hotels on the following schedule.

Sheraton Hotel

Sunday through Wednesday:
9:30am-10:00am Floor 3
3:00pm-3:30pm Floor 3

Holiday Inn

Sunday, 9:30am-10:00am Crystal Ballroom A, Floor B3
Sunday, 3:00pm-3:30pm Hari's Bar, Mezzanine
Monday, 9:30am-10:00am Hari's Bar, Mezzanine
Monday, 3:00pm-3:30pm Hari's Bar, Mezzanine
Tuesday, 9:30am-10:00am Avenue Room, Floor 1
Tuesday, 3:00pm-3:30pm Hari's Bar, Mezzanine
Wednesday, 9:30am-10:00am Hari's Bar, Mezzanine
Wednesday, 3:00pm-3:30pm Hari's Bar, Mezzanine

Networking & Social Events

SUNDAY, JUNE 25

Welcome Reception

6:30pm-8:00pm

Sheraton – Ballroom, Floor 3

Wear Badge For Admission

INFORMS and the Hong Kong 2006 Committee welcome you to Hong Kong and the INFORMS International Meeting. Meet with colleagues and enjoy hors d'oeuvres at this Welcome Reception. Complimentary soft drinks and water; cash bar for other beverages. Your meeting registration fee covers admission to this reception. If your guest would like to accompany you, a guest registration must be purchased. The US\$75 guest fee also includes the General Reception on Monday evening.

MONDAY, JUNE 26

General Reception

7:30pm-9:30pm

Sheraton – Ballroom, Floor 3

Wear Badge For Admission

Our General Reception features the food and the culture of Hong Kong in an evening of wonderful

entertainment. You will delight to the traditional Chinese dragon dance, in which a team of dancers carries the dragon on poles, mimicking its sinuous movements to musical accompaniment. An exciting performance of Chinese acrobatics, with balancing and juggling acts, will amaze you. And you won't want to miss "Mask Illusion," a fascinating performance by a master of illusion and intrigue.

The menu for the reception features traditional Hong Kong foods, such as dim sum and Peking Duck, as well as a broad selection of other hors d'oeuvres and sweets. You can select from buffets of various foods placed around the Ballroom. Soft drinks and water are complimentary; cash bar for other beverages.

Wear badge for admission. If your guest would like to accompany you, a guest registration must be purchased (guests will receive a special badge). The US \$75 guest fee also includes the Welcome Reception on Sunday evening.

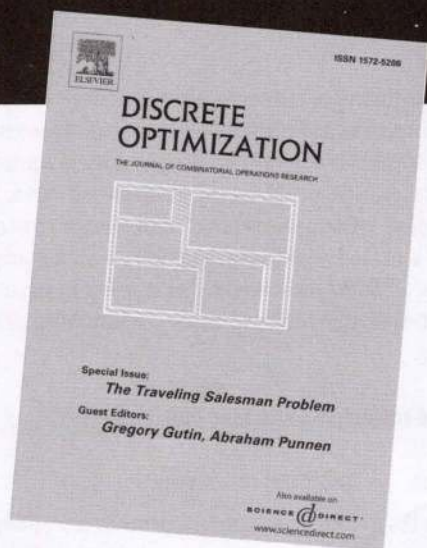


**ONLINE SUBMISSION
NOW AVAILABLE**

Discrete Optimization publishes original research papers on the mathematical, computational and applied aspects of all areas of integer programming and combinatorial optimization. In addition to reports on mathematical results pertinent to discrete optimization, the journal welcomes submissions on algorithmic developments, computational experiments, and novel applications (in particular, large-scale and real-time applications). The journal also publishes clearly labelled surveys, reviews, short notes, and open problems.

Easy online submission

Authors are encouraged to submit their papers electronically using EES, Elsevier's online submission, peer-review and editorial system.



Editors:

P.L. Hammer (Editor-in-Chief)
Rutgers University

J. Lee (Managing Editor)
IBM T.J. Watson Research Center

www.elsevier.com/locate/disopt

Visit the exhibits located at the Sheraton,
next to the Ballroom on Floor 3.

Exhibit hours:

Sunday	3:00pm-8:00pm
Monday	9:00am-5:00pm
Tuesday	9:00am-5:00pm
Wednesday	9:00am-3:30pm

AMPL Optimization LLC

900 Sierra Pl. SE
Albuquerque, NM 87108-3379
847-846-8486
www.ampl.com

AMPL Optimization LLC develops and supports the AMPL modeling language and distributes several large-scale solvers including Ziena Optimization's KNITRO, ARKI Development's CONOPT, OptiRisk Systems' FortMP/QP/SP and SAMPL/SPlnE. Over 30 other solvers work with AMPL, as do the AMPL Studio graphical interface and Windows COM objects developed by OptiRisk Systems.

Decisioneering, Inc.

Techmax Information Technology
(Hong Kong) Company
Unit 903, Grand City Plaza
1 Sai Lau Kok Rd.
Tsuen Wan, Hong Kong
852-3520-0520
www.techmax.com.hk

Since 1986, Decisioneering has been providing Crystal Ball risk analysis software and solutions. With offices in the United States, United Kingdom and Germany, and an international network of partners, Decisioneering provides customers worldwide with the tools, solutions and services they need to improve the quality of their critical business decisions.

ILOG, Inc.

889 Alder Ave., Ste. 200
Incline Village, NV 89451
775-881-2800
www.ilog.com

ILOG is the world leader in delivering optimization tools, engines and applications for solving the most challenging optimization problems. Attend our free technical product workshops and visit our booth. See what's new in ILOG CPLEX 10.0. See special previews of ILOG OPL Development Studio 5.0 and ILOG Optimization Decision Manager 2.0 (ODM). What problems can we help you solve?

INFORMS

7240 Parkway Dr., Ste. 310
Hanover, MD 21076
800-446-3676/410-850-0300
www.informs.org

Stop by the INFORMS exhibit for the latest information on networking, meetings, publications, industry happenings and benefits and services.

Maximal Software, Inc.

2111 Wilson Blvd., Ste. 700
Arlington, VA 22201
703-522-7900
www.maximalsoftware.com

Maximal Software is the developer of MPL Modeling System, an advanced modeling language for formulating optimization models. We will demonstrate how MPL provides one of the fastest and most scalable modeling languages on the market, and how the OptiMax 2000 Component Library add-on can be used to build customized end-user applications to solve real-world optimization problems.

Minitab Inc.

1829 Pine Hall Rd.
State College, PA 16801
814-238-3280
www.minitab.com

MINITAB® Release 14 is a powerful, yet easy-to-use statistical software package designed for people who teach or perform data analysis to obtain accurate, reliable and easy-to-use solutions. From scientists to students, engineers to nurses, MINITAB offers solutions to users at every level. Please visit www.minitab.com for a free demo.

Springer

Tiergartenstr. 17
69121 Heidelberg
Germany
+49-6221-487-8994
www.springer.com

Come visit the Springer exhibit, browse our extensive product offerings in operations research and enjoy a 20% discount on all your purchases. Meet Gary Folven, Senior Editor in Business & OR. Springer publishes more than 3,500 books and 1,250 journals per year. For complete information on all of our content, visit: www.springer.com.

Taylor & Francis

325 Chestnut St.
Philadelphia, PA 19106
215-625-8900
www.taylorandfrancis.com

Taylor & Francis is among the world's leading academic publishers in all areas of applied mathematical science. Visit our exhibit to receive free journal sample copies and a conference discount on all books. For further information and a comprehensive list of our titles, visit www.taylorandfrancis.com.

Combined Book Display

Visit the combined book display for important titles from Elsevier, MIT Press, IOS Press and World Scientific Publishing.



Plenary Presentations

WELCOME ADDRESS

Sunday, June 25
11:45am-12:40pm
Sheraton – Ballroom, Floor 3

O.R. Research and Applications in China

Professor Ya-xiang Yuan
President, Operations Research Society of China
Vice President, Academy of Mathematics and
Systems Science of the Chinese Academy
of Sciences

In this Welcome Address for the conference, Professor Ya-xiang Yuan will provide a brief history of modern operations research in mainland China. He will present an overview of recent advances in O.R. research and applications in China, and will review the major activities of the Operations Research Society of China, particularly in recent years. Opportunities and challenges for the development of O.R. in China will also be discussed.



Professor Ya-xiang Yuan received the B.S. degree (1981) in Computational Mathematics from Xiangtan University, Hunan, China, and the Ph.D. degree (1986) in Applied Mathematics from Cambridge

University, UK. He was a Rutherford Research Fellow of Fitzwilliam College, Cambridge from Oct 1985 to Sept 1988. He became a full professor at the Computing Centre of Chinese Academy of Sciences in Nov. 1988, the youngest full professor of the Chinese Academy of Sciences (CAS) at that time. Currently he is a vice president of the Academy of Mathematics and Systems Science of CAS, and the director of the Institute of Computational Mathematics and Scientific/Engineering Computing. Currently, Professor Yuan is the president of the Operations Research Society of China, vice president of the Chinese Mathematical Society and vice president of the China Society of Industrial and Applied Mathematics. His major research focuses on numerical methods for nonlinear optimization, particularly on trust region algorithms, quasi-Newton methods, and conjugate gradient methods. His current research interests include null space techniques for nonlinear optimization, quadratic assignment problems, trust region interior point methods for nonlinear optimization, and mixed least square problems.

KEYNOTE PRESENTATION

Monday, June 26
11:45am-12:40pm
Sheraton – Ballroom, Floor 3

Supply Chains with Conscience: The Social Responsibility Dimension of Supply Chain Management

Professor Hau L. Lee
Thoma Professor of Operations, Information
and Technology
Graduate School of Business
Stanford University

Increasingly, companies have begun initiatives to examine the social responsibility dimensions of their supply chains. Such dimensions include social welfare, economic equity, and environmental responsibilities. Interestingly, socially responsible supply chains happen to be ones that are also highly successful in business performance. Hence, social responsibility and business success can go hand in hand. What are the key issues and concerns that have gained attention in industry on socially responsible supply chains? What new teaching materials are useful? What new research ideas are forming? Professor Hau Lee will give an overview of these questions, and examine current developments on environmentally sound supply chains, social welfare and equity issues, ways to help develop supply chains in under-developed countries, and advancements in humanitarian logistics.



Professor Hau L. Lee is the Thoma Professor of Operations, Information and Technology at the Graduate School of Business at Stanford University. His areas of specialization include supply chain manage-

ment, information technology, global logistics system design, inventory planning, and manufacturing strategy. He is the founding and current Co-Director of the Stanford Global Supply Chain Management Forum, an industry-academic consortium to advance the theory and practice of global supply chain management. He is also an adjunct professor at Hong Kong University of Science and Technology. Professor Lee received the Harold Lardner Prize for International Distinction in Operations Research, Canadian Operations Research Society, 2003. He was elected a Fellow of Manufacturing and Service Operations Management, INFORMS, 2001; Fellow of the Production and Operations Management Society, 2005; and Fellow of INFORMS, 2005. He is the current President of the Production and Operations Management Society. His article, "The Triple-A Supply Chain," was the Second Place Winner of the McKinsey Award for the Best Paper in 2004 in the *Harvard Business Review*. From 1997-2003, he was the Editor-in-Chief of *Management Science*. Professor Lee obtained his B.Soc.Sc. degree in Economics and Statistics from the University of Hong Kong in 1974, his M.Sc. degree in Operational Research from the London School of Economics in 1975, and his M.S. and Ph.D. degrees in Operations Research from the Wharton School of the University of Pennsylvania in 1983.



Plenary Presentations

PHILIP MCCORD MORSE LECTURE

Tuesday, June 27
11:45am-12:40pm
Sheraton – Ballroom, Level 3

Strengthening Our Empirical Research Base

Professor Marshall Fisher
UPS Professor of Operations and Information Management
The Wharton School
University of Pennsylvania

In this McCord Morse Distinguished Lecture, Professor Marshall Fisher suggests that we can learn from the prospering fields of physics, medicine, and finance the value of a strong empirical dimension to our research that is well integrated with theoretical research. These fields have all made intellectually profound contributions on problems of monumental impact. Their strong empirical tradition insures both a steady supply of rich, real problems, and a flow back into the world of research results. Professor Fisher will use empirical research in these fields to formulate a framework for thinking about empirical research and illustrate that framework with a few selected examples of empirical research in operations research. He will conclude with some suggestions for how to turbocharge empirical research in operations research.



Professor Marshall Fisher is the UPS Professor of Operations and Information Management at the Wharton School of the University of Pennsylvania and Co-director of the Fishman-Davidson Center for Service and Operations Management. He holds an S.B. in electrical engineering, an MBA and a Ph.D. in operations research, all from MIT. His pioneering research in supply chain management has been implemented by many companies and recognized by numerous awards. He is a recipient of the 1977 Lanchester Prize for the best paper in operations research in that year, the 1983 Edelman Prize for development of a large-scale logistics planning model for a major industrial gas firm, 2005 Philip McCord Morse Lectureship Award and the E. Grosvenor

Plowman Award from the Council of Logistics Management for contributions to logistics. He is a Fellow of INFORMS, MSOM and POMS and a member of the National Academy of Engineering. In 2005, his paper "The Lagrangian Relaxation Method for Solving Integer Programming Problems" was voted by the membership of INFORMS as one of the ten most influential papers published in *Management Science* during its 50-year history. He served as president of the Institute of Management Science during 1988-89. Professor Fisher has been a consultant to more than 80 companies, including Ahold, Air Products and Chemicals, BMG, Campbell Soup, Dupont, Exxon, Frito Lay, General Motors, IBM, Nike, Nokia, Scott Paper and Spiegel, Inc. In 1981, he co-founded Distribution Analysis, Research and Technology, Inc. and served as Chairman of this company until its merger with Manugistics Inc. in 1990. He is a cofounder and Chairman of 4R Systems, Inc., a company that provides supply chain planning software to retailers of short lifecycle products

FEATURED SESSIONS

Featured Workshop

SC11 & continued SD11 (1:30-5:00pm)
Sunday, Sheraton-Boardroom
Scenarios for the Future of ORMS Practice
Jay Horton, Managing Director, Strategis Partners.
Chair: Grace Lin, IBM Business Consulting Services.
The objective of this interactive workshop is to apply scenario planning to the future of ORMS Practice.

Omega Rho Featured Session

MA03—Monday, 8:00-9:30am, Sheraton-Ballroom A
Cyber Infrastructure: Initiatives at the U.S. National Science Foundation
Stephen G. Nash, Division of Design & Manufacturing Innovation, National Science Foundation. Chair: Yupo Chan, Univ. of Arkansas at Little Rock.

This special Omega Rho session will be followed by three sessions on Tuesday co-sponsored with the INFORMS Section on Location Analysis and INFORMS Transportation & Logistics Society (TA18, TB18 and TD18).



Invited & Sponsored Cluster Chairs

Applied Probability

Joint Invited/Sponsored

Jim Dai

Georgia Tech
dai@isye.gatech.edu

John Hasenbein
University of Texas at Austin
jhas@mail.utexas.edu

Artificial Intelligence, ES & Neural Networks

T. Warren Liao
Louisiana State University
ieliao@lsu.edu

Bioinformatics

Metin Turkey
Koc University
mturkey@ku.edu.tr

Capacity Planning

Alf Kimms
Technical Univ. Bergakademie Freiberg
alf.kimms@bwl.tu-freiberg.de

Cutting & Packing

Andrea Lodi
University of Bologna
alodi@deis.unibo.it

Data Envelopment Analysis

Lawrence M. Seiford
The University of Michigan
seiford@umich.edu
Joe Zhu
Worcester Polytechnic Institute
jzhu@wpi.edu

Data Mining & Knowledge Recovery

Joint Invited/Sponsored

Kwok Tsui
Georgia Tech
ktsui@isye.gatech.edu

Fugee Tsung
Hong Kong Univ. of Science and Technology
season@ust.hk

Decision Analysis

Jian-Min Jia
The Chinese University of Hong Kong
jjia@cuhk.edu.hk

Shouyang Wang
Chinese Academy of Sciences
sywang@amss.ac.cn

Discrete & Combinatorial Optimization

Bo Chen
University of Warwick
Bo.Chen@wbs.ac.uk

Energy, Natural Resources & the Environment

Edward Anderson
Australia Grad. School of Management
eddiea@agsm.unsw.edu.au

Shi-Jie Deng
Georgia Institute of Technology
deng@isye.gatech.edu

Enterprise Integration

Thomas Gullledge
George Mason University
gullledge@gmu.edu

Flexible Manufacturing Systems

Kathryn Stecke
University of Texas Dallas
kstecke@utdallas.edu

Fuzzy Sets & Systems

Shu Cherng Fang
North Carolina State University
fang@eos.ncsu.edu

Health Applications

Joint Invited/Sponsored

Yasar A. Ozcan
Virginia Commonwealth University
ozcan@hsc.vcu.edu

Information Security

Hyeun-Suk (Sue) Rhee
University of Texas-Dallas
suerhee@utdallas.edu

Information Systems & Electronic Commerce

T.P. Liang
National Sun Yat-Sen University
tpliang@mail.nsysu.edu.tw

Knowledge-Based Resource Management

A.D. Amar
Seton Hall University
amaramar@shu.edu

Location Analysis

Vedat Verter
McGill University
vedat.verter@mcgill.ca

Logistics

N. Viswanadham
National University of Singapore
mpenv@nus.edu.sg

Marketing Science

Kristiann Helsen
Hong Kong Univ of Science & Technology
mkhel@ust.hk

Mass Customization in Manufacturing

Mitchell Tseng
Hong Kong Univ. of Science and Technology
tseng@ust.hk

Jianxin (Roger) Jiao
Nanyang Tech. University
jiao@pmail.ntu.sg



Invited & Sponsored Cluster Chairs

Mathematical Programming/ Optimization

Joint Invited/Sponsored

Yinyu Ye
Stanford University
yinyu-ye@stanford.edu

Shuzhong Zhang
The Chinese University of Hong Kong
zhang@se.cuhk.edu.hk

Eva Lee
Georgia Institute of Technology
evakylee@isye.gatech.edu

Medical Applications

Horst Hamacher
University Kaiserslautern
hamacher@mathematik.uni-kl.de

Operations Management

Nesim Erkip
Bilkent University
nesim@bilkent.edu.tr

Practice: ORMS in Practice

Grace Lin
IBM Business Consulting Services
gracelin@us.ibm.com

Practice: Strategic Marketing

Jihong Jin
WellsFargo Bank
jihong.jin@wellsfargo.com

Jianmin Liu
WellsFargo Bank
jiliu@ggu.edu

Production-Inventory Systems

Saif Benjaafar
University of Minnesota
saif@umn.edu

Production Systems & Management

Ronald G. Askin
University of Arizona
ron@sie.arizona.edu

Quality, Statistics & Reliability

Joint Invited/Sponsored

Fugee Tsung
Hong Kong Univ. of Science and Technology
season@ust.hk

Kwok Tsui
Georgia Institute of Technology
ktsui@isye.gatech.edu

Queueing Theory & Reliability Analysis

Kuo-Hsiung Wang
National Chung Hsing University
khwang@amath.nchu.edu.tw

Revenue Management & Dynamic Pricing

Goutam Dutta
Indian Institute of Management
goutam@iimahd.ernet.in

Scheduling

Nicholas G. Hall
Ohio State University
hall_33@cob.osu.edu

Shipping, Transport & Supply Chain Logistics

John Liu
Hong Kong Polytechnic University
John.Jianhua.Liu@inet.polyu.edu.hk

Simulation

Joint Invited/Sponsored

Stephen E. Chick
INSEAD
stephen.chick@insead.edu

Hong Wan
Purdue University
hwan@purdue.edu

Special Sessions

Hirofumi Matsuo
Kobe University
matsuoh@kobe-u.ac.jp

Stochastic Models of Logistics & Supply Chain

Xiuli Chao
North Carolina State University
xchao@ncsu.edu

Supply Chain Models

Kevin H. Shang
Duke University
khshang@duke.edu

Jeannette Song
Duke University
jssong@duke.edu

Supply Chain Planning & Advanced Planning Systems

Herbert Meyr
Vienna Univ. of Econ. & Business Admin.
Herbert.meyr@wu-wien.ac.at

Hans-Otto Guenther
Technical University of Berlin
ho.guenther@ww.tu-berlin.de

Supply Chains

Fangruo Chen
Columbia University
fc26@columbia.edu

Transportation Science & Logistics

Joint Invited/Sponsored

Raymond Cheung
Hong Kong Univ. of Science and Technology
rcheung@ust.hk

Tien Fang Fwa
National University of Singapore
cvefwatf@nus.edu.sg

Web-Service Related Technology

Benjamin Yen
Hong Kong University
benyen@business.hku.hk



future INFORMS Meetings

INFORMS NATIONAL MEETINGS 2006

July 13-16

INFORMS Teaching of Management Science Workshop

San Francisco State University

San Francisco, California

Chair: Stephen G. Powell

www.informs.org/Edu/TMSWorkshop/TMS06/index.php

November 5-8

INFORMS Annual Meeting 2006 Pittsburgh

Pittsburgh Convention Center & Westin Convention Center Hotel

Pittsburgh, Pennsylvania

Chair: Michael A. Trick, Carnegie Mellon University

www.informs.org/Conf/Pittsburgh06

2007

April 29-May 1

INFORMS Practice Conference: Applying Science to the Art of Business

Sheraton Vancouver Wall Centre

Vancouver, BC, Canada

Chair: Jack Levis, UPS

www.informs.org/Conf/Practice07

July 8-11

INFORMS International Puerto Rico 2007

Westin Rio Mar Beach Resort & Spa

Rio Grande, Puerto Rico

Chair: Karla Hoffman, George Mason University

www.informs.org/Conf/PuertoRico2007

November 4-7

INFORMS Annual Meeting 2007 Seattle

Washington State Convention & Trade Center and Sheraton Seattle

Seattle, Washington

Chair: Zelda B. Zabinsky, University of Washington

zelda@u.washington.edu

2008

INFORMS Practice Conference: Applying Science to the Art of Business

Spring 2008: Dates and location to be announced.

October 12-15

INFORMS Annual Meeting 2008 Washington

Marriott Wardman Park Hotel & Omni Hotel

Washington, DC

Chair: Hani S. Mahmassani, University of Maryland

masmah@mail.umd.edu

INFORMS ANNUAL MEETINGS 2009-2010

October 11-14, 2009

INFORMS Annual Meeting 2009 San Diego

San Diego Convention Center and Hilton San Diego

Chair: Soheila Jorjani, California State University-

San Marcos

November 7-10, 2010

INFORMS Annual Meeting 2010 Austin

Austin Convention Center and Hilton Austin

Chair: Jonathan Bard, University of Texas at Austin

Go to
www.informs.org/Conf
for a searchable INFORMS
Conference Calendar.



INFORMS SUBDIVISION MEETINGS 2006

July 24-26

Military Applications Society Conference

Mystic Hilton

Mystic, Connecticut

Chairs: James Christis, James Moore, AFIT

<http://military-appl.society.informs.org/>

November 4-5

CIST-INFORMS Conference on Information Systems & Technology

Westin Convention Center Hotel

Chairs: Brian Butler, University of Pittsburgh

Rahul Telang, Carnegie Mellon University

www.pitt.edu/~cist2006/

December 3-6

Winter Simulation Conference 2006

Monterey Conference Center & Portola Plaza Hotel

Monterey, California

Chair: David Nicol, Univ. of Illinois-Urbana

Champaign

www.wintersim.org

2007

January 3-5

10th INFORMS Computing Society Conference

Colonnade Hotel

Coral Gables, Florida

Conference Co-Chairs:

Edward Baker, Anito Joseph, Anuj Mehrotra,

University of Miami

Michael Trick, Carnegie Mellon University

<http://moya.bus.miami.edu/~ebaker/>

June 28-30

INFORMS Marketing Science Conference

Singapore Management University

Singapore

Co-Chairs: Sundar Bharadwaj, Jin Han, Tan Chin

Tiong, Singapore Management Univ.; David

Montgomery, Stanford

<http://www.business.smu.edu.sg/mks2007/index>

July 9-11

INFORMS Applied Probability Society Conference

EURANDOM & University of Eindhoven

Eindhoven, The Netherlands

Co-Chairs: Onno Boxma, Eindhoven Univ.; Michel

Mandjes, CWI

<http://appliedprob.society.informs.org/>

INFORMS2007/Index.html



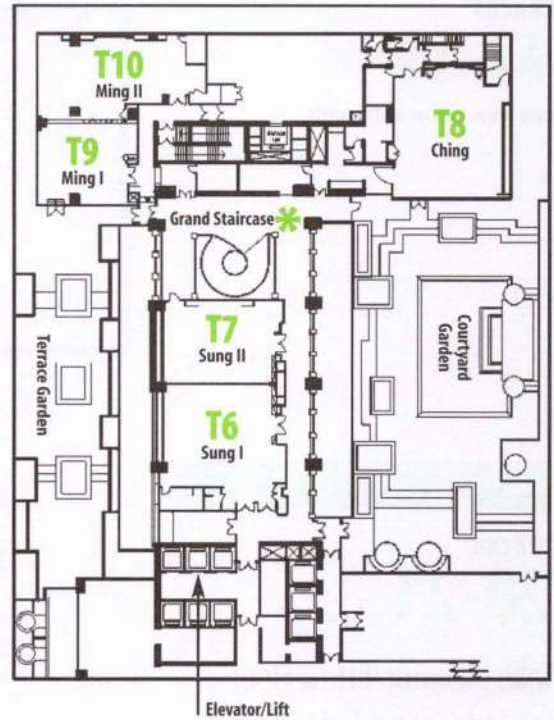
Sheraton Hong Kong

Track Numbers are shown for Technical Session rooms

* Session Monitor Desk

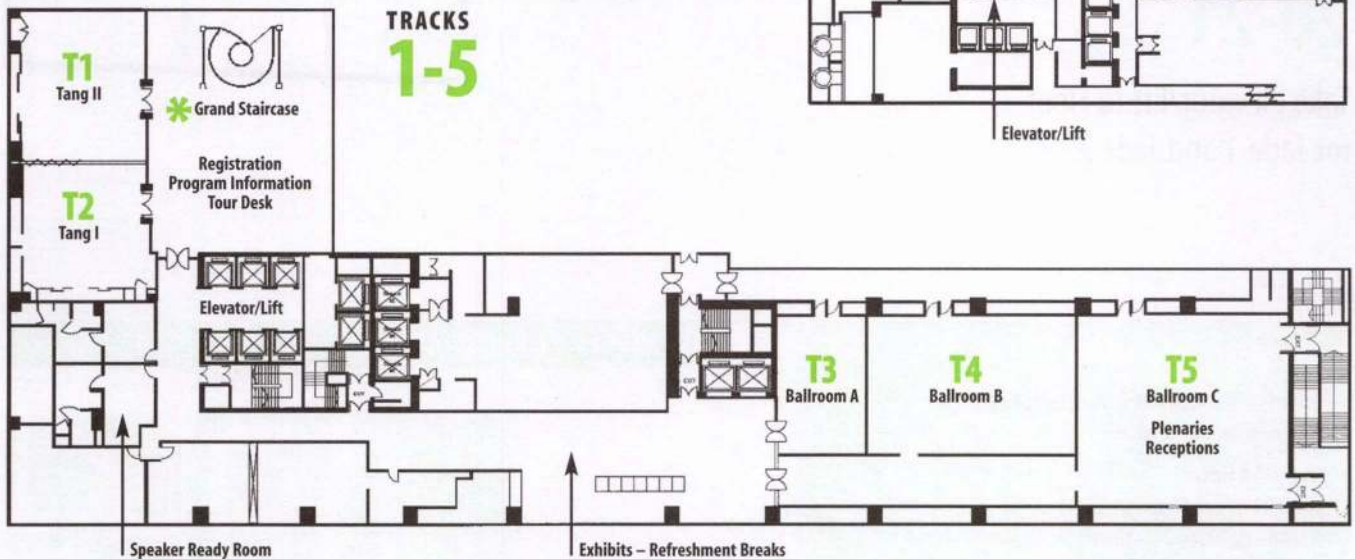
FLOOR 4

TRACKS 6-10



FLOOR 3

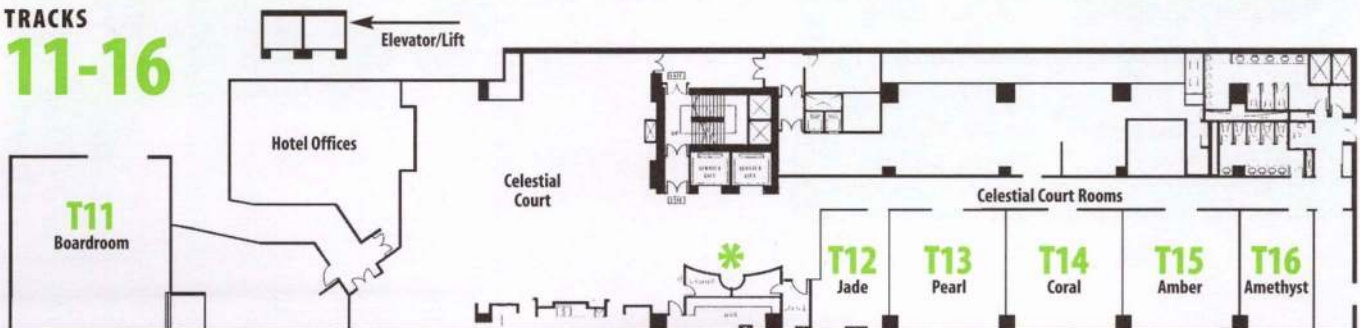
TRACKS 1-5



15

FLOOR 2

TRACKS 11-16



Holiday Inn Golden Mile

Track Numbers are shown for Technical Session rooms

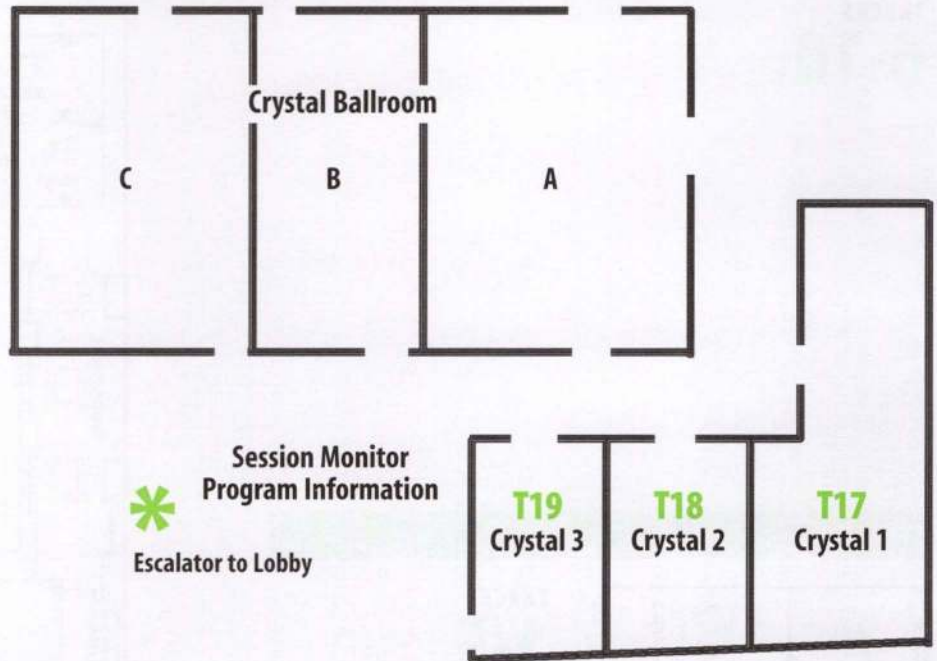
* Session Monitor Desk

FLOOR B3

TRACKS

17-19

One level below hotel lobby



FLOOR 2

TRACKS

20-21

Take elevator/lift to Floor 2 for Jade 1 and Jade 2.

16

REFRESHMENT BREAKS

Refreshment breaks are held in both hotels on the following schedule.

Sheraton Hotel

Sunday through Wednesday:

9:30am-10:00am Floor 3

3:00pm-3:30pm Floor 3

Holiday Inn

Sunday, 9:30am-10:00am Crystal Ballroom A, Floor B3

Sunday, 3:00pm-3:30pm Hari's Bar, Mezzanine

Monday, 9:30am-10:00am Hari's Bar, Mezzanine

Monday, 3:00pm-3:30pm Hari's Bar, Mezzanine

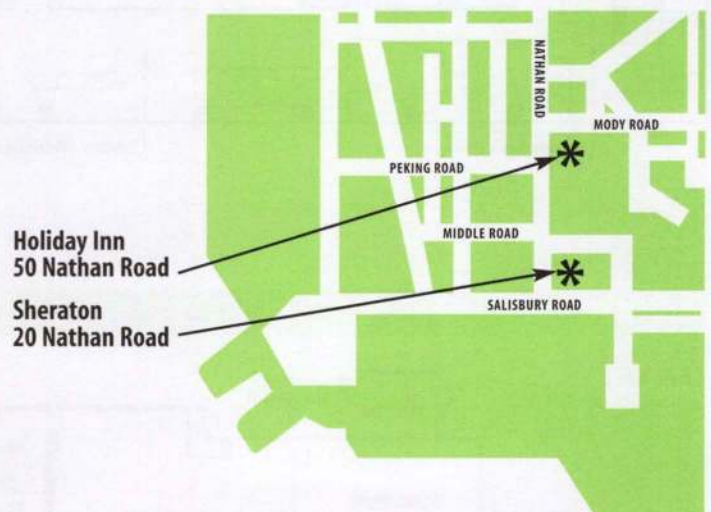
Tuesday, 9:30am-10:00am Avenue Room, Floor 1

Tuesday, 3:00pm-3:30pm Hari's Bar, Mezzanine

Wednesday, 9:30am-10:00am Hari's Bar, Mezzanine

Wednesday, 3:00pm-3:30pm Hari's Bar, Mezzanine

SHERATON TO HOLIDAY INN



How to Navigate the Technical Sessions

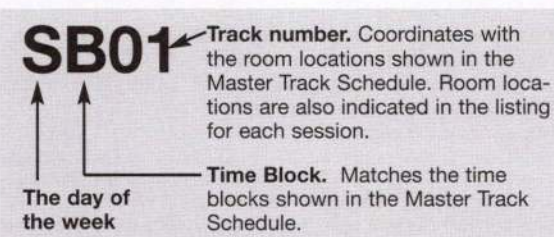
There are four primary resources to help you understand and navigate the Technical Sessions:

- This Technical Session listing, which provides the most detailed information. The listing is presented chronologically by day/time, showing each session and the papers/abstracts/authors within each session.
- The Session Chair, Author, and Session indices provide cross-reference assistance (pages 123-135).
- The map and floor plans on pages 15 and 16 show you where technical session tracks are located.
- The "Master Track Schedule" is on page 136 and the inside back cover. This is an overview of the tracks (general topic areas) and when/where they are scheduled.

Quickest Way to Find Your Own Session

Use the Author Index (pages 125-132) — the session code for your presentation(s) will be shown along with the room location (abbreviated). You can also refer to the full session listing for the room location of your session(s).

The Session Codes



Time Blocks

Sunday, Monday and Tuesday:

- A — 8:00am - 9:30am
- B — 10:00am - 11:30am
- C — 1:30pm - 3:00pm
- D — 3:30pm - 5:00pm

Wednesday:

- A — 8:30am - 9:30am
- B — 10:00am - 11:30am
- C — 11:45am - 1:15pm
- D — 1:30pm - 3:00pm
- E — 3:30pm - 5:00pm

Room Locations/Tracks

These are shown with the initial of the building, followed by the room name. For example:

S - Ballroom C H - Crystal 3

Quick Reference

Don't miss the "Quick Reference," a separate flier you received in your registration packet. It includes the Master Track Schedule and floor plans, providing a quick, portable summary of the meeting

Sunday, 8:00am - 9:30am

SA01

S-Tang II

Advances in Statistical Applications

Cluster: Quality, Statistics and Reliability - Joint Invited/Sponsored
 Chair: Yong Chen, University of Iowa, 2138 Seamans Center, Iowa City, IA, United States, yongchen@engineering.uiowa.edu

Co-Chair: Jun Yan, University of Iowa, 241 Schaeffer Hall, Iowa City, IA, 52242, United States, jyan@stat.uiowa.edu

1 - Partly Functional Regression Model for Point Processes

Jun Yan, University of Iowa, 241 Schaeffer Hall, Iowa City, IA, 52242, United States, jyan@stat.uiowa.edu

This article proposes a partly functional regression model for the mean function of point processes, where some covariate effects are time-independent while others are completely unspecified in time. Estimating equations for the time-independent covariate effects and the time-varying covariate effects are developed. The practical usefulness of the methodology is demonstrated through simulation studies and a real example of recurrent exacerbations among cystic fibrosis patients.

2 - Monitoring of Process and Sensor Fault Based on a Fault-quality Model

Yong Chen, University of Iowa, 2138 Seamans Center, Iowa City, IA, United States, yongchen@engineering.uiowa.edu

Linear fault-quality models have been developed in recent years for quality modeling and improvement. Changes on quality characteristics are typically due to process faults and/or sensor faults. An SPC strategy is developed in this research to online monitor both process and sensor faults. The process faults and sensor faults can be monitored separately by projecting observations of quality characteristics to two orthogonal spaces based on the fault-quality model.

SA02

S-Tang I

Joint Session Data Mining/QSR: Information Technology

Cluster: Data Mining & Knowledge Recovery - Joint Invited/Sponsored

Chair: George Michailidis, gmichail@umich.edu

1 - Mixture Modeling for Active Delay Tomography

Earl Lawrence, Statistical Sciences Group, Los Alamos National Laboratory, Los Alamos, NM, 87545, United States, earl@lanl.gov

Active network delay tomography is concerned with the estimation of link-level delay distributions based on measured end-to-end path delays. Parametric models are often inadequate for capturing delay behavior and nonparametric models can be cumbersome to estimate. This talk will explore the use of mixture modeling as a flexible tool for capturing both overall shape and tail behavior of the estimated link-delay distributions. Applications to real and simulated data will be considered.

2 - Collection and Real-Time Analysis of Network-Temporal Data

Lorraine Denby, Avaya, 233 Mount Airy Road, Basking Ridge, NJ, 07920, United States, ld@avaya.com, Akshay Adhikari, Jean Meloche

In IP telephony, voice is sent in a sequence of individual packets from one point in the network to another. We consider the analysis of data that relate to the quality of VoIP (Voice over IP) and describe the Chatter system, a hierarchical and distributed real-time monitoring system for quality in VoIP networks. Chatter performs the analysis of this network-temporal data and provides visualizations for the data that often reveals aspects of the data that are otherwise not suspected.

3 - Network Anomography: Robust, General Network-Level Anomaly Inference

Matthew Roughan, The University of Adelaide, Australia, matthew.roughan@adelaide.edu.au, Zihui Ge, Albert Greenberg, Yin Zhang

Anomaly detection is a first and important step needed to respond to unexpected problems and to assure high performance and security in IP networks. We introduce a framework and a powerful class of algorithms for [em network anomography.] the problem of inferring network-level anomalies from widely available data aggregates. The framework contains the novel, recently published based on Principal Component Analysis (PCA). Moreover, owing to its clear separation of inference and component anomaly detection, the framework opens the door to the creation of whole families of new algorithms. We introduce

several such algorithms here, based on ARIMA, Fourier, Wavelet, and Principal Component Analysis. To evaluate these algorithms, we used several weeks of traffic data collected from the Abilene network and from a large Tier-1 ISP network. To compare performance, we use the methodology put forward earlier for the Abilene data set. The findings are encouraging. Among the new algorithms introduced here, we see: high accuracy in detection (few false negatives and few false positives), and high robustness (little performance degradation in the presence of measurement noise, missing data and routing changes).

■ SA03

S-Ballroom A

Simulation Based Optimization

Contributed Session

Chair: XueNing Chu, School of Mechanical and Power Engineering, Shanghai JiaoTong University, 1954# HuaShan Road, Shanghai, P.R. China, Shanghai, China, xnchu@sjtu.edu.cn

1 - Does Quality Pay: A DEA Study of the Motor Carriers' Performances

Patrick Lee, Assoc. Professor of Oper. Mgt., Fairfield University, IS/OM Department, Fairfield University, Fairfield, CT, 06824, United States, plee@mail.fairfield.edu, Patricia Poli

Based on multiple input costs of operations with multiple output records of revenue, and quality on the motor carriers of US, DEA is the natural choice of performance tool to evaluate the motor carriers' performances. The DEA of 160 motor carriers used shows that 20 DMUs are on the efficient frontier. However, by isolating the output factors individually, the DEA analyses of revenue, and quality, respectively, agree with the overall conclusion that quality leaders are revenue leaders as well, with one exception, which can be attributed to the end point of the frontier.

2 - Dynamic Partial-Overlapping Batch Means in Simulation Output Analysis

Wheyming Song, Institute of Statistics and Department of IEEM, Tsing Hua University, wheyming@ie.nthu.edu.tw, Mingchang Chih

Estimating the variance of the sample mean is a classical problem of stochastic simulation. Traditional batch means estimators require specification of the simulation run length a priori. The dynamic non-overlapping batch means (DNBM) and the dynamic partial-overlapping batch means (DPBM) estimators are the only existing variance estimators requiring a constant storage space for any sample size. Although both DNBM and DPBM requires $O(n)$ computation time and finite $O(1)$ memory space, the DPBM is superior to the DNBM method in terms of the mse criterion. In this talk we continue to investigate properties of DPBM estimators including choosing the optimal or a reasonable batch sizes.

3 - Design and Improvement of Service Quality by Customer Driven QFD

Pony Chen, Candidate for PhD, Chung Hua University, No.27 Lane 93, Niu-Pu South Rd., Hsinchu, Hsinchu, Taiwan, pony@lsgas.com.tw

This research is proposed a revised Kano equation model, further, integrate with QFD to categorize the attribute, then through the revised gap analysis to evaluate the satisfaction, so that these information can provide the manager what are the priority and importance and direction of service quality of design and improvement.

4 - Study on Virtual Prototype Technology of Horizontal Directional Drill

XueNing Chu, School of Mechanical and Power Engineering, Shanghai JiaoTong University, 1954# HuaShan Road, Shanghai, P.R. China, Shanghai, China, xnchu@sjtu.edu.cn, Zaifang Zhang

Aimed to the current status of research on Horizontal Directional Drill, the architecture of a multidisciplinary virtual prototype system was presented. The mechanical model, hydraulic model, strength model and controlling model were built, and the virtual prototyping integrating these models was established through parameter correlation. Dynamic performance, performance of hydraulic system and strength of key parts were analyzed through the technology of integrating simulation.

■ SA04

S-Ballroom B

Quality and Reliability

Contributed Session

Chair: Tzeng Lun Chung, Far East College, No.35, Lane 239, Dachiau 2nd St., Yongka, Tainan Country, Taiwan, lunchunglct@yahoo.com.tw

1 - Identification of Control Chart Pattern Using Time-delay Neural Network

Kuo-Chang Wu, Graduate student, Department of Industrial Engineering and Management, I-Shou University, No. 1, Sec. 1, Syuecheng Rd., Dashi Township., Kaohsiung County, Ta, 840, Taiwan, m9320007@stmail.isu.edu.tw, Yu-Min Chiang

The process control chart is a powerful tool for monitoring the process variations. Once a process variation occurs, the control chart will presents a pattern. The research establishes an identification system for control chart patterns by using a time-delay neural network (TDNN) due to its good performance in recognition of time related data. The control chart patterns such as Shift, Trend and Cycle can be recognized by the TDNN based identification system.

2 - Control Design for Risk Management in Business Processes

Xue Bai, Carnegie Mellon University, Heinz School, 4800 Forbes Ave., Pittsburgh, PA, 15213, United States, xb@cmu.edu

This paper proposes a probabilistic modeling framework for error composition and propagation in business processes, and the optimal control designs under risk constraints.

3 - Methodical Approaches Satisfaction Assessment Surveys

Fethullah Caliskan, Senior Researcher, TUBITAK, The Scientific & Technological Research Council of Turkey, Baris M. Kosuyolu C. No:48, P.K. 14 Gebze, Kocaeli, 41401, Turkey, fcaliskan@tusside.gov.tr

Observing satisfaction of stakeholders is a major concern of quality management. Hence, satisfaction assessment surveys possess critical importance. However, making assessments, generally, method of application is not concerned as important as design, analysis or evaluation. The presentation focuses on new methodic approaches that enhance reliability, coverage and assurance of surveys. It also comprises some service industry experiences to demonstrate the advantages of mentioned approaches.

4 - Relationships between Service of Medical Quality, Operation Performance and Customer Satisfaction

Tzeng Lun Chung, Far East College, No.35, Lane 239, Dachiau 2nd St., Yongka, Tainan Country, Taiwan, lunchunglct@yahoo.com.tw

This study examined the Correlation Model among Service of Medical Quality, Operation Performance, Job satisfaction and Post-purchase intentions under National Health Insurance. A total of 270 outpatients and hospital staff from three hospitals in Tainan, Taiwan were interviewed. Results showed that there is correlation between quality of medical service and operation performance. In addition, there is a relation between quality of medical service and post-purchase intentions.

■ SA05

S-Ballroom C

Flexibilities in Operations Management

Cluster: Supply Chain Models

Invited Session

Chair: Peng Sun, psun@duke.edu

1 - Parametric Variance and Inventory Models

Peng Sun, psun@duke.edu

The value function of a Markov Process is subject to errors caused by estimation errors in the transition probability models. In this talk, we present second order approximations of the value function estimates for discounted and long run average Markov and Semi-Markov processes. We then illustrate its effect in the world-driven demand inventory management systems through computation.

2 - Design and Evaluation of Long-Term Supply Contracts in the Presence of Spot Market

Youyi Feng, Associate Professor, Dept., of SEEM, Chinese University of Hong Kong, Sha Tin, N.T., Hong Kong SAR, Hong Kong, HK, Hong Kong, yyfeng@se.cuhk.edu.hk

We consider a make-to-stock manufacturing system that produces a single product to be sold in a spot market and through a long-term supply contractual channel. The price in the spot market is random, and evolves as a continuous-time Markov chain. The demand in the spot market follows a Markov Modulated Poisson Process. The system is obligate to fulfill contract orders. We unveil that the manufacturer and the contractual partner can reach an economic Nash equilibrium point to strike a deal.

3 - Lead Time and Price Quotation Mode Selection: Uniform or Differentiated?

Xuying Zhao, University of Texas at Dallas, School of Management, SM 30, 2601 N. Floyd Rd., Richardson, Tx, 75080, United States, xuying.zhao@utdallas.edu, Kathryn E. Steckle, Ashutosh Prasad

Firms in the make-to-order industry often provide lead time and price quotations to customers. When a firm offers a single lead time and price, it is called uniform quotation mode. When a firm offers a menu of lead times and prices for customers to choose from, it is called differentiated quotation mode. By modeling, analyzing, and comparing these two quotation modes, we provide guidelines for a manager to choose a suitable quotation mode for his/her firm.

■ SA06

S-Sung I

Supply-Chain Management

Cluster: Operations Management
Invited Session

Chair: Ananth Iyer, Professor, Krannert School of Management, Purdue University, West Lafayette, IN, 47907, United States, aiyer@mgmt.purdue.edu

1 - Identifying Beneficial Collaboration Securely in Decentralized Logistics Systems

Ananth Iyer, Professor, Krannert School of Management, Purdue University, West Lafayette, IN, 47907, United States, aiyer@mgmt.purdue.edu, Clifton Chris, Wei Jiang, Murat Kantarciovglu, Jaideep Vaidya, Richard Cho

Sharing capacity across decentralized service providers can lead to improvements in logistics efficiency but sharing the information needed poses interesting problems. We focus on the problem faced by independent trucking companies that have separate pickup and delivery tasks, present an algorithm finds opportunities to swap loads while maintaining anonymity of other data, then apply this algorithm to a dataset and show significant opportunities to improve efficiency.

2 - Coordinating Forecast Effort in Decentralized Supply Chains

Ozalp Ozer, Assistant Professor, Stanford University, 380 Panama Mall, Stanford, 94305, United States, oozer@stanford.edu, Onur Uncu

We study a supply chain in which a contract manufacturer produces and sells through multiple retailers. The retailers can exert costly effort to obtain forecast information and share their forecasts with the manufacturer. The manufacturer uses this forecast information to expand capacity. We design an options contract through which the manufacturer induces the retailers to exert forecast effort and characterize when doing so is supply chain optimal.

■ SA08

S-Ching

Probability and its Applications

Contributed Session

Chair: Mete Sirvanci, Professor, Univ. of Wisconsin-Whitewater, Marketing Department, Whitewater, WI, 53190, United States, sirvancm@uww.edu

1 - Performance of the IEEE 802.11 Distributed Coordinate Function

Gang Uk Hwang, KAIST, 373-1 Guseong-dong Yuseong-gu, Taejeon, South Korea, guhwang@amath.kaist.ac.kr

In this paper, we consider a cluster of saturated IEEE 802.11 Distributed Coordinate Function terminals, and analyze the statistical characteristics of the cluster such as the inter-transmission time distribution of packets and the service time distribution of the cluster.

2 - Testing Treatment Effects of Binary Response Adaptive Designs

Xikui Wang, Dr., Department of Statistics, University of Manitoba, Winnipeg, MB, Canada, xikui_wang@umanitoba.ca, Yanqing Yi

The dependency of data in response adaptive designs induces the difficulties of statistical inference such as testing treatment effects. This paper discusses the consistency and asymptotic normality of maximum estimator of the parameters for a wide class of response adaptive designs. Although the samples are dependent in the designs, it is proved that chi square statistic is still valid under certain conditions of an allocation rule.

3 - Optimal Merging and Its Evaluation in Multicast Streaming Service

Hiroshi Toyozumi, Associate Professor, Waseda University, Nishi-waseda 1-6-1, Shinjuku, Tokyo, 169-8050, Japan, toyozumi@waseda.jp

Combining multicast and unicast, we show the download rate from the streaming server can be effectively reduced. By modeling the request from users as a Poisson arrival, we can derive the optimal combination of unicast and multicast. Even in the large-scale streaming service, the download rate will be reduced by the order of $n^{1/2}$, where n is the number of users in the streaming service.

4 - A Martingale Approach to a Ruin Model with Surplus Following a Compound Poisson Process

Eui Yong Lee, Professor, Sookmyung Women's University, Department of Statistics, Seoul, 140-742, South Korea, eylee@sookmyung.ac.kr, Kyung Eun Lim, Miock Jeong, Soo-Mi Oh

We consider a ruin model whose surplus process is formed by a compound Poisson process. If the level of surplus reaches $V > 0$, it is assumed that a certain amount of surplus is invested. In this paper, we apply the optional sampling theorem to the surplus process and obtain the expectation of period T , time from origin to the point where the level of surplus reaches either 0 or V . We also derive the total and average amount of surplus during T by establishing a backward differential equation.

5 - Application of the Theory of Runs to Games of Chance

Mete Sirvanci, Professor, Univ. of Wisconsin-Whitewater, Marketing Department, Whitewater, WI, 53190, United States, sirvancm@uww.edu

Among the casino games, in roulette, one of the strategies recommended by the experts is to play martingales. In a martingale system bets are doubled until a win occurs. Because of table limits a player cannot always recover losses and to continue playing too long increases the chance for failure (loss) runs. The question that arises is whether there are optimal strategies for playing martingale system in roulette. Probabilities are calculated for this purpose.

■ SA09

S-Ming I

Deterministic Scheduling Models and Applications

Cluster: Scheduling
Invited Session

Chair: Chung-Lun Li, Department of Logistics, The Hong Kong Polytechnic University, Hung Hom, Kowloon, Hong Kong, lgtclli@polyu.edu.hk

1 - Efficient No-wait Multi-hoist Scheduling and its Applications

Jiyin Liu, Professor, Loughborough University, Business School, Loughborough, LE, LE11 3TU, United Kingdom, J.Y.Liu@lboro.ac.uk, Yun Jiang

We first study the no-wait version of the multi-hoist cyclic scheduling problem and develop a polynomial solution to minimize the production cycle length. Then we consider the general multi-hoist cyclic scheduling problem and propose an effective heuristic solution procedure making use of the no-wait algorithm. Computational results are provided.

2 - Coordinated Scheduling of Customer Orders with Decentralized Machine Locations

Jinwen Ou, Department of Logistics, The Hong Kong Polytechnic University, Hung Hom, Kowloon, Hong Kong, 03900425R@polyu.edu.hk, Chung-Lun Li

We consider a scheduling model with two machines at different locations. Each job is composed of two tasks, where each task must be processed by a specific machine. The finished tasks are shipped to a distribution center in batches before they are bundled together and delivered to the customers. We develop a heuristic for this model and analyze its performance.

3 - Single Machine Scheduling with Resource Dependent Release Times and Processing Times

Xiuli Wang, Department of Automation, Shanghai Jiaotong University, Shanghai, China, wangdu0816@163.com, T.C. Edwin Cheng

We consider the single machine scheduling problem with resource dependent release times and processing times to minimize the makespan plus the total resource consumption costs. We propose a heuristic algorithm for the problem and analyze its performance bound.

4 - Single Machine Scheduling with Fixed Interval Job Ready Times

Guohua Wan, Associate Professor, University of Macau, FBA,
Univ. of Macau, Taipa, Macau, China, ghwan@umac.mo

We consider a non-preemptive single-machine scheduling problem with fixed ready dates, where the time between two consecutive ready dates is a constant. Given a set of jobs, the objective is to schedule the jobs such that the sum of completion time or makespan of the schedule is minimized. We show that both problems are NP-hard, and develop dynamic programming algorithms and heuristics for solving the problems. Efficient algorithms are also developed to solve some special cases of the problems.

SA10

S-Ming Li

Applications of Optimization I

Cluster: Mathematical Programming/Optimization
Joint Invited/Sponsored

Chair: Tim (Carl) Kelley, NC State University, Department of
Mathematics, Box 8205, Raleigh, NC, 27695-8205, United States,
tim_kelley@ncsu.edu

1 - Parallel Multigrid Solution of Control-constrained Optimal Control Problems

Craig Douglas, Professor, University of Kentucky,
773 Anderson Hall, Lexington, KY, 40506-0046, United States,
douglas@cs.yale.edu, Alfio Borzi

We present a parallel multigrid method to efficiently solve elliptic optimal control problems. We show results for the control of 2D nonlinear and 3D linear problems. We deal with the control of a solid fuel ignition model giving rise to a singular optimal control problem. The optimality systems are solved to 2nd order accuracy by a multigrid method whose convergence properties are independent of the values of the weights in the cost functionals and of the number of grid points.

2 - Treatment Planning of Radiofrequency Ablation of Tumors

Ariela Sofer, Professor and Chair, George Mason University,
SEOR Dept., Fairfax, VA, 22030, United States, asofer@gmu.edu

Radiofrequency ablation is a minimally invasive technique for killing tumors by heat. One or more needles are placed at the tumor site and alternating current is applied, thus creating frictional heat. Temperatures in excess of 50 C kill tissue. The treatment planning problem is to determine the number of needles and their positions, to guarantee that the entire tumor is killed while damage to vital healthy tissue is minimized. We discuss the challenges and propose initial solution approaches

3 - Implicit Filtering and Optimal Design Problems

Tim (Carl) Kelley, NC State University, Department of
Mathematics, Box 8205, Raleigh, NC, 27695-8205, United States,
tim_kelley@ncsu.edu

In this presentation we describe the implicit filtering method and our new matlab implementation. The new implementation incorporates new options for model Hessians, parallelism, and local and global surrogates models. We illustrate the features of the new code with an application to groundwater remediation.

SA17

H-Crystal Room 1

Networks Design

Contributed Session

Chair: ChaoYuan Yue, Department of Control Science and
Engineering, Huazhong University of Science and Technology, Wuhan,
PR China, Institute of systems engineering, WuHan, 430074, China,
xueshengsushe@163.com

1 - Research on the Identifying Methods for Network Feasibility under Generalized Precedence Relations

ChaoYuan Yue, Department of Control Science and Engineering,
Huazhong University of Science and Technology, Wuhan, PR
China, Institute of Systems Engineering, WuHan, 430074, China,
xueshengsushe@163.com

We propose distinguishing methods for network feasibility in an acyclic network with fixed subproject durations under GPRs, study the identifying methods for subprojects and GPRs arcs which need to be adjusted when the network is infeasible. Furthermore, the time complexity of the proposed algorithm is analyzed. Finally, an example is presented.

2 - A Capacity Scaling Procedure for the Capacitated Network Design Problem with Piecewise Linear Costs

Mingzhe Chen, Tokyo University of Marine Science and
Technology, 2-1-6 Ecyujima, Koutouku, Tokyo, TK, 135-8533,
Japan, mchen@e.kaiyodai.ac.jp, Naoto Katayama, Mikio Kubo

We present a capacity scaling procedure for the multi-commodity capacitated network design problem with piecewise linear costs using approximate extended formulations. This procedure consists in solving linear approximate problems with adjusted arc capacities at each iteration. Three types of formulations involving normal, strong and extended forcing constraints are analyzed by our procedure. Numerical experiments show that our approach gives better solutions than another method.

SA18

H-Crystal Room 2

Optimization of Logistics Systems

Contributed Session

Chair: Felix Papier, University of Cologne, Dept. of SCM & MS,
Albertus-Magnus-Platz, Koeln, 50923, Germany,
felix.papier@uni-koeln.de

1 - Linearization of a Non-Linear Mixed Integer Lean Supply Chain Model via Separable Programming

Wilfrido Kabling, De La Salle University - Manila, 2401 Taft
Avenue, Manila, Philippines, wikokabling@yahoo.com,
Dennis Cruz

This paper presents the separable programming approach employed in linearizing the formulation by Cruz and Kabling (2006), which models a four-echelon stochastic-demand supply chain, with provisions for lean logistics. This establishes that the optimal solution obtained by linear optimization techniques would result in the global cost minimum

2 - Modeling Supply Chain Synchronization Problem: A Stochastic Petri Net Method

Yue Xiong, National University of Singapore, Dept. Civil
Engineering, NUS, 10 Kent Ridge Crescent, Singapore, 119260,
Singapore, g0300291@nus.edu.sg

Supply Chain Synchronization(SCS) problem can be described as overstocks of materials when they are not needed and shortages when they are required. Due to the variability existing in supplier's production system and buyer's own production schedules, the SCS problem always exists. This paper provides a Stochastic Petri Net (SPN) method to model SCS problems. Through SPN model, we can mathematically measure the impact of poor synchronization, and examine the performance of various solutions.

3 - Optimal Acquisition Policies for Different Discount Schemes with Uncertain Demands

Guoqing Zhang, University of Windsor, 401 Sunset Avenue,
Windsor, Canada, gzhang@uwindsor.ca, Liping Ma

We consider a multi-product multi-supplier system with uncertain demands, where suppliers provide different quantity or volume discount schemes. A series of MINLP models are developed to formulate the optimal acquisition problems. Furthermore, the optimal acquisition policy and the production level for the manufacturer are obtained simultaneously by solving the models with a GAMS and its solvers. A preliminary results and comparison will be reported.

4 - Solving Routing Problem in Fourth-Party Logistics by Simplified Mechanism & Hybrid Immune Algorithm

Min Huang, Professor, Northeastern University, Box 135, Faculty
of Information Science, and Engineering, Northeastern University,
Shenyang, 110004, China, mhuang@mail.neu.edu.cn, Qing Wang,
Xin Xu, Xingwei Wang, Wei Tong

Recently, Fourth-Party Logistics (4PL) is drawing attentions of researchers. However, due to the complexity the research of routing problem in 4PL is in an initial stage. In this paper, a mathematical model for this problem is set up based on nonlinear integer programming and multigraph. With respect to the problem's characteristics a mechanism for simplification is designed and a hybrid immune algorithm is proposed. The example simulation suggests that the hybrid algorithm is effective.

5 - Optimizing Fleet Size and Structure of a Rail Car Rental System with Seasonal and Batched Demand

Felix Papier, University of Cologne, Dept. of SCM & MS, Albertus-
Magnus-Platz, Koeln, 50923, Germany, felix.papier@uni-koeln.de,
Ulrich Thonemann

We analyze a rental system for rail cars in which demand occurs in batches and is affected by seasonality. We model the system by using a batch-arrival loss system, and we consider two cases: In one case, the rental company has only its own fleet of fixed size. In the other case, it can lease additional rail cars. Our objective is to maximize the expected profit. We derive optimal fleet sizes and leasing quantities, and we show under what conditions it is beneficial to merge two fleets into one.

■ SA19

H-Crystal Room 3

Issues in Enterprise Resource Planning

Contributed Session

Chair: Chen-Mei Huang, Doctoral Student, National Central University, No.300, Jhongda Rd., Jhongli City, Taoyuan County, 32001, Taiwan, 93441025@cc.ncu.edu.tw

1 - The Impact of ERP Performance Improvement with Regard to the Top Management Leadership

Chen-Mei Huang, Doctoral Student, National Central University, No.300, Jhongda Rd., Jhongli City, Taoyuan County, 32001, Taiwan, 93441025@cc.ncu.edu.tw, Ping-Yu Hsu

The studies of enterprise resource planning (ERP) so far have limited focus on that top management's leadership affects the performance improvement. To fill this gap, this study develops a research model to explore the relationship between ERP performance improvement and top management leadership.

2 - Applying Theory of Constraint in Enterprise to Implement ERP System

Chen Cheng-Hsiung, Vanung University, No. 1 Van-Nung Rd., Chung-Li, 32045, Taiwan, cjs@vnu.edu.tw

The introduction of ERP system and supply chain management is able to provide integrated and accurate information for making decisions in quick response and business globalization. The purpose of the study is to consider the organizational change management and the reasonable work flows of production, material, and procurement management activities in developing the supply chain management system for commerce industry.

3 - The Study of Relationships Between Project Management and Implementation Performance of ERP

Jau-Yang Lliu, PhD Student, National Central University, 320 Jhongli, Taiwan, ROC, Jhongli, Taiwan, liu78705@yahoo.com, Yi-Wen Fan, Wen-Hsien Tsai

This study explores the relationships between the achievement of project management and the degree of performance improvement of Enterprise Resource Planning (ERP). DeLone & McLean's (1992) information systems (IS) success framework will be used to assess enterprises' performance improvement and project management in the post-implementation stage.

■ SA20

H-Jade Suite 1

Strategic Management of Business Processes

Contributed Session

Chair: Ruel-Lung Lai, Vanung University, No.1 Van-Nung Rd., Chung-Li, Tao-Yuan, Tao-Yuan, Taiwan, tony@vnu.edu.tw

1 - Dynamic System Modeling for Closed Loop Supply Chains (CLSC) System

Jitendra Madaan, Research Scholar, Indian Institute of Technology, New Delhi, SB 11 Kumoan Hostel, Hauz Khas, New Delhi, De, 110016, India, jitman77@gmail.com, Subhash Wadhwa

In this paper, we adopt the SD methodology as a modeling and analysis tool to tackle strategic issues for CLSC. We present guidelines for the methodology and present its development for the strategic dynamic system modeling of single and multi-level return chains. Finally, we demonstrate the methodological contribution by extending and improving the application of SD Modeling to closed loop supply chain management.

2 - Enhancing Business Strategy Through a Process-Based Framework Model

Dr. Mabel Kung, Professor, California State University at Fullerton, 800 North State College Blvd, Dept. Of Information Systems & Decisions, Fullerton, CA, 92834-6848, United States, mkung@fullerton.edu

A process-based framework model is presented in the design of software applications. Guideline and people issues identify ways to help corporate users in developing systems computing to be successful. The value-oriented process technique is used as a strategic alignment to improve investment value.

3 - Product Design for Supply Chain at Hewlett Packard

Brian Cargille, APJ Manager, HP Strategic Planning and Modeling, 452 Alexandra Rd, Singapore, 119961, brian.cargille@hp.com

The concept of "design for supply chain" (DfSC) is not new at Hewlett-Packard. For more than ten years the company has evaluated the supply chain impacts of design decisions. Indeed, two early examples - DeskJet localization and LaserJet universality - are widely used as MBA and IE/OR academic case studies. What is new is the innovation that has allowed HP to deploy DfSC in a systematic, repeatable, and broad-based way to hundreds of product development teams and thousands of engineers across the company. The methodologies HP uses for DfSC

will be introduced with example results from HP's printing, computing, and server businesses. A consumer printer case study will be reviewed in detail, showing the best that DfSC has offered HP - multiple techniques working in concert. The methods used for spreading DfSC techniques across HP will be outlined, with a practice session on rough cut analysis and pointers provided to industry resources and support.

4 - Assessing Business Networks Innovation Dynamics as Ecosystems: A Critical Review of Analysis Methodologies

Luigi Cuccia, DTMPiG, Università degli Studi di Palermo, Palermo, Italy, lcuccia@dtm.unipa.it, G. Perrone, U. La Commare

This paper provide a critical review of the state of the art of the "Business Ecosystem" management theory, focusing on its strategy and management of innovation aspects, on the complexity theoretical approach used, and on the compliance of the agent based modeling and simulation methodology. Furthermore, the paper provides a prospective framework for assessing further research paths on the field. The goal is achieved through the following steps: First the subject is approached by examining biological ecosystem analogies. Second, business ecosystem concept is outlined by discussing and comparing views of main contributors. Third, the emerging research field of complexity science is brought out due to the authors attitude to consider ecosystems and business ecosystems as complex, adaptive systems. Fourth, the agent based model simulation methodology is assessed in order to understand how to exploit it in the study of innovation dynamics in a business ecosystem.

5 - Integration and Application for ERP System - Using Business Process Oriented Methodology

Ruei-Lung Lai, Vanung University, No.1 Van-Nung Rd., Chung-Li, Tao-Yuan, Tao-Yuan, Taiwan, tony@vnu.edu.tw

The industry-specific ERP are concise and suitable, they produce more rapid effectiveness, less impact on organization adjustment, and require smaller investments for a business. Using business process oriented methodology to implement an ERP system environment will be useful for reducing the parallel-run effect and shortening production setup times.

Sunday, 10:00am - 11:30am

■ SB01

S-Tang II

Quality and Reliability Assessment in Nanofabrication

Cluster: Quality, Statistics and Reliability - Joint Invited/Sponsored

Chair: Suk Joo Bae, Assistant Professor, Hanyang University, 17, haengdang-dong, seongdong-gu, Seoul, 133-791, South Korea, sjbae@hanyang.ac.kr

1 - Reliability Evaluation in Carbon Nanotubes for Display Devices

Suk Joo Bae, Assistant Professor, Hanyang University, 17, haengdang-dong, seongdong-gu, Seoul, 133-791, South Korea, sjbae@hanyang.ac.kr, Paul Kvam

As one of the main building blocks of nano-devices, Carbon nanotubes (CNTs) are tube-shaped graphene sheets with extraordinary electrical, mechanical, and chemical properties. We will describe the basic structures of the CNTs and then characterize the physical degradation results from the nano-manufacturing process. As our motivating examples, we focus on the reliability study of flat panel displays called field emission displays (FEDs) that consist of carbon nanotubes.

2 - Spatial Modeling of Clustered Defects Across a Wafer Map

Way Kuo, Distinguished Professor and Dean of Engineering, University of Tennessee, Knoxville, TN, 37996, United States, way@utk.edu, Suk Joo Bae, Jung Yoon Hwang

The need for accurate yield prediction is increasing for estimating productivity and production costs to secure high revenues in the semiconductor industry. To this end, we introduce new modeling approaches for spatially clustered defects on an integrated circuit (IC) wafer map. The spatial model shows more potential as a yield model by detecting spatial pattern of clustered defects which are commonly observed in an IC wafer map.

3 - Uniformity Control Chart

Chang Wook Kang, Professor, Hanyang University, 1271 Sa-1-dong Sangnok-ku, Ansan, South Korea, cwkang57@hanyang.ac.kr, Man Sik Lee

A vital part of modern statistical process control is to monitor variability. In some settings that the coefficient of variation should be constant, we use the chart for monitoring the coefficient of variation. The chart however is not robust to its underlying distribution. We propose a control chart that uses a min-max ratio of the data for checking the uniformity of the process. The uniformity control chart can be applied for the semiconductor fabrication process.

4 - Statistical Models for Hot Electron Degradation in Nanoscaled MOSFET Devices

Suk Joo Bae, Assistant Professor, Hanyang University, 17, haengdang-dong, seongdong-gu, Seoul, 133-791, South Korea, sjbae@hanyang.ac.kr, seong joon kim, Bae Jin Lee

In a metal-oxide-semiconductor (MOS) structure, hot carrier interface state generation (HCI) is a critical feature of the item's lifetime measurement. Understanding of physical mechanisms of hot carrier injection will provide meaningful clues for backtracking from observed macro-defects to inferred nano-defects scattered inside the MOSFET devices. We investigate physical models of the defects (hot carriers) generation leading to failure based on statistical properties for MOSFETs.

■ SB02

S-Tang I

Joint Session Data Mining/QSR: Statistics in Industry and Business

Cluster: Data Mining & Knowledge Recovery - Joint Invited/Sponsored

Chair: Vijay Nair, Professor and Chair, University of Michigan, Department of Statistics, Ann Arbor, MI, United States, vnn@umich.edu

1 - Monitoring Consumer Opinion using PLS Methods

Graciela Gonzalez-Farias, Dr., CIMAT, Jalsico s/n, Mineral de Valenciana, Guanajuato, GT, 36240, Mexico, farias@ciamat.mx, Alberto Ferrer

Massive amounts of data are routinely collected from processes in modern highly automated industries and markets. These data often exhibit high correlation, rank deficiency, low signal-to-noise ratio and missing values. PLS becomes a strategic tool able to adapt to very different scenarios: e.g., on-line predictive modeling. We illustrate an interesting way to understand the consumer opinion in the beverage consumption industry.

2 - A Framework for Designing Efficient Simulations for Complex Queueing Systems

George Michailidis, gmichail@umich.edu

In this talk, we present a methodological framework for designing efficient simulations for complex networks, where the goal is to approximate the response surface of the underlying system. The proposed approach works in a sequential manner and combines the methods of CART (Classification And Regression Trees) and the design of experiments. The results of the proposed methodology are illustrated on a model of a generalized switch.

3 - Degradation Modeling and Reliability Inference

Xiao Wang, Assistant Professor, University of Maryland, Baltimore County, 1000 Hilltop Circle, Baltimore, MD, United States, wangxiao@math.umbc.edu, Vijay Nair

We consider reliability inference based on a class of degradation models derived from nonhomogeneous Gaussian processes. These models can accommodate a variety of degradation rates and shapes. They also lead naturally to a wide class of time-to-failure (TTF) distributions. The inverse Gaussian distribution plays a central role. We discuss parametric and nonparametric inference of the TTF distribution as well as the underlying degradation function.

■ SB03

S-Ballroom A

Decision Making using Optimization

Contributed Session

Chair: Jitendra Madaan, Research Scholar, Indian Institute of Technology, New Delhi, SB 11 Kumaon Hostel, Hauz Khas, New Delhi, De, 110016, India, jitman77@gmail.com

1 - Linear Combinations of Variance Estimators of the Sample Mean

Wenchi Chiu, Department of Industrial Engineering, National Tsing Hua University,, Hsinchu, Taiwan, wenchichiu@yahoo.com.tw, Wheming Song, David Goldsman

Various estimators have been proposed to estimate the variance of sample mean in stochastic simulations, and techniques like batching and combination are also suggested to obtain better estimates. We analyze the impacts of batching and combination techniques on both bias and variance of the estimator, and identify the tradeoff between these two impacts. To using these two techniques, we propose a linear combination of standardized time series weighted area estimator. We also evaluate our estimator with Monte Carlo examples.

2 - Development of the Simulation System for Evaluation of Postal Transportation Network

Jiyoung Choi, ETRI, 161 Gajeong-dong Yuseong-gu, Daejeon, South Korea, cjy@etri.re.kr, Sangyong Park, Taehan Lee, Suk Lee

In the postal transportation, it is important to make a good transportation plan and to manage the plan efficiently. But the change of transportation plan is not a simple work. So, a methodology to check the effect of the change of the transportation plan in advance is required. In this paper, we develop a simulation model to evaluate the performance of a postal transportation plan. We apply our simulation model and system to the real change of transportation plan in Korea Post.

3 - Modeling Multiple Technology Competition-diffusion: Agent-based Simulation Approach

Juneseuk Shin, PhD Student, Dept. of Industrial Engineering, Seoul National University, San 56-1, Sillim-dong, Gwanak-Gu, Seoul, South Korea, astraeus@hanmail.net, Jeewon Choi, Yongtae Park, Seunghoon Lee

This study aims at modeling diffusion of technologies on a social network. Recent studies have begun to employ an agent-based modeling method. However, the agent-based models are still constrained to the diffusion of a single technology. In practice, new technologies come to the market in a variety of forms, hence, we extend existing models to allow for more realistic modeling of multiple technology competition-diffusion and we illustrate the outcomes of our model through agent-based simulation.

4 - Two-Sided Bayesian Process Control Schemes

George Nenes, Aristotle University, University Campus, Thessaloniki, Greece, gnenes@auth.gr, George Tagaras

We propose a two-sided economically designed Bayesian control chart for monitoring the mean of a quality characteristic in short runs. At each sampling instance the probabilities of operating out of control are updated using Bayes' theorem. All chart parameters are adaptive and depend on these probabilities. We derive properties that facilitate the optimization of the scheme and we compare its cost against the expected cost of alternative control charts.

5 - Dynamic System Modeling for Closed Loop Supply Chains (CLSC)

Jitendra Madaan, Research Scholar, Indian institute of Technology Delhi, SB11 Kumaon Hostel, IIT Hauz Khas, New Delhi, New Delhi, 1100016, India, jitman77@yahoo.com, Subhash Wadhwa

Strategic decision makers need comprehensive models to guide for efficient decision-making that increases the profitability of the entire return chain. In this paper, we adopt SD methodology as a modeling and analysis tool to tackle strategic issues for CLSC. We present guidelines for development of strategic dynamic system modeling in single/multi-level return chains. Finally, we demonstrate the methodological contribution by improving the application of System Dynamics Modeling to CLSC management

■ SB04

S-Ballroom B

Models for Resource Allocation

Contributed Session

Chair: Hannah Wong, PhD Candidate, University of Toronto, 5 King's College Road, Toronto, ON, M5S 3G8, Canada, hjwong@mie.utoronto.ca

1 - A New Method For Transfer Mimimax Objective Function To Minimum Or Maximum Function

Yaser Jalali Manesh, Iran University of Science and Technology, I.E Dep. Iran University of Science & Tech, Narmac, Tehran, Iran, yaser.j@gmail.com, Mir.B. Aryanezhad

Minimax or Maximin objective functions are used in various models in OR fields such as assignment, scheduling, routing and etc. This O.Fs cause models to be more complicated. In recent researches, much work has been done to change this O.Fs into simple O.Fs. In this paper we suggest a method for changing minimax functions into different kinds of minimum functions by defining an assignment cost matrix. We will evaluate this method with scheduling models and comparing results with other methods.

2 - Optimal Allocation of Boat Resources at Coast Guard Districts

Zinovy Radovitsky, Professor, CSU East Bay, 25800 Carlos Bee Blvd., Hayward, CA, 94506, United States, zinovy.radovitsky@csueastbay.edu, Tamara Koermer

We developed an application of optimal allocation of small boats among the stations of the U.S. Coast Guard Pacific Area. For this, we have formulated a mixed-integer linear programming model that was solved using Premium Solver software in Excel. The received solutions drastically improved the distribution of boats and positively affected boat capacity effectiveness while utilizing fewer boats.

3 - The Research on the Evolution Mechanism of the Start-up Social Network Atlas Based on the Network Growth

Huatao Peng, School of Management, Wuhan University of Technology, Wuhan University of Technology, Wuhan, China, zhouchunmei@163.com

This article attempts to construct Markov chain model of the start-up social network atlas based on network growth. Then the synthesis discussion is used in the Markov condition shift, and the start-up social network individual owns the risk non-conservation, the risk ultra cycle of operations, risk strong locking as well as the risk immunity when the start-up social network atlas take on inserts, the drifting, the jump as well as lives extinguishes.

4 - A System Dynamics Approach to Resource Allocation at Toronto Western Hospital

Hannah Wong, PhD. Candidate, University of Toronto, 5 King's College Road, Toronto, ON, M5S 3G8, Canada, hjwong@mie.utoronto.ca, Michael Carter

Senior managers at Toronto Western Hospital would like to quantify the impact that General Internal Medicine inpatient units have on their Emergency Department (ED). A system dynamics model was built to simulate the flow of patients, arriving at the ED, through the hospital and to other health care sectors. The model will provide a means for identifying bottlenecks, scenario testing of policies and allocating scarce resources.

SB05

S-Ballroom C

Issues in Supply Chain Management

Cluster: Supply Chain Models

Invited Session

Chair: Woonghee Tim Huh, Assistant Professor, Columbia University, 500 W 120th Street, MC 4704, Dept. of IEOR, New York, NY, 10027, United States, th2113@columbia.edu

Co-Chair: Ganesh Janakiraman, gjanakir@stern.nyu.edu

1 - Optimal Control of Selling Channels for an Online Retailer with Cost-Per-Click Payments and Seasonal Products

Frank Chen, Associate Professor, Chinese University of Hong Kong, Dept. of Sys. Eng. & Eng. Mgmt., Shatin, New Territory, Hong Kong, China, yhchen@se.cuhk.edu.hk

The problem studied in this paper is a predigestion of the decision faced by online retailers (etailers) that advertise on websites of third parties (e.g., comparison-shopping sites) under a cost-per-click (CPC) scheme. The CPC rate for a prominent placement is normally set by competitive bidding and thus varies over time. This paper addresses etailer's dynamic decisions of whether or not to list on the websites of third parties.

2 - Procurement Risk Management using Options: Random Spot Price and the Portfolio Effect

Chung-Piaw Teo, National University of Singapore, Business Link, Singapore, Singapore, bizteocp@nus.edu.sg, Qi Fu, Chung-Yee Lee

This paper examines a single-period optimal contract procurement problem when both the demand and spot market price mechanism are random. Faced with uncertain demand D , and a random (exogenous) spot price q , we would like to construct an optimal portfolio procurement strategy from n option contracts, each with unit reservation cost c_j and execution cost h_j ($i=1, \dots, n$). All excess demands are met from the external spot market. This basic model generalizes a series of recent work on portfolio contract management, and forms the core of many procurement risk management models in this area. We study the optimal procurement strategy in this setting and investigate the impact of the random spot market on the contract market. More importantly, we obtain a new geometric interpretation of the optimal cost function in terms of conditional moments decomposition. This enables us to use a simple graphical technique to obtain the optimal solution and the resulting cost function. We use this insight to analyze the extent of the benefit of portfolio procurement over single sourcing. The geometric approach also allows us to derive a close form expression for the benefits of demand consolidation in the portfolio contract procurement environment and develop a graphical view of the risk pooling effect.

3 - Optimal Linear Inventory Replenishment Policies in a Two-stage Supply Chain with Arbitrary Lead-times

G. Gaalman, University of Groningen, Faculty of Management and Organization, P.O. Box 800, AV Groningen, Netherlands, g.j.c.gaalman@bdk.rug.nl, Stephen Disney

We develop an integral inventory replenishment policy for a two stage supply chain by minimizing the sum of the retailer and supplier inventory variances. The influence of lead-time differences will be shown. The results are compared when the retailer and supplier use a local order-up-to policy for general ARMA demand processes.

SB06

S-Sung I

Capacity Issues in Supply Chains

Cluster: Operations Management

Invited Session

Chair: Osman Alp, Bilkent University, Industrial Engineering Department, Bilkent, Ankara, TR, 06800, Turkey, osmanalp@bilkent.edu.tr

1 - Workforce Capacity Management in Make-to-Stock Systems with Uncertain Supply of Contingent Labor

Osman Alp, Bilkent University, Industrial Engineering Department, Bilkent, Ankara, TR, 06800, Turkey, osmanalp@bilkent.edu.tr, Fazil Pac, Tarkan Tan

In this talk, we analyze the joint workforce capacity and inventory management of a firm that observes stochastic and seasonal demand. The firm maintains a permanent workforce level throughout a given planning horizon and also may hire temporary workers from an external labor supply agency which can provide workers only with a certain level of uncertainty. We analyze the characteristics of the optimal inventory replenishment and contingent workforce hiring policies.

2 - Integrated Capacity and Inventory Management with Positive Lead Times for Capacity Acquisition

Tarkan Tan, Assistant Professor, Eindhoven University of Technology, Dept. of Technology Management, Paviljoen F-07, Eindhoven, 5600MB, Netherlands, t.tan@tm.tue.nl, Osman Alp, Gergely Mincsovcics

In this talk, we discuss an integrated model for inventory and flexible capacity management under non-stationary stochastic demand and positive lead times for temporary capacity acquisition. We analyze the characteristics of the optimal policy and we evaluate the value of utilizing flexible capacity under different settings, which enable us to develop managerial insights.

3 - A Base-stock Model for the Kit Management Problem

Refik Gullu, Professor, Bogazici University, Industrial Engineering Department, Bogazici University Bebek, Istanbul, TR, 34342, Turkey, refik.gullu@boun.edu.tr, Murat Köksalan

In this talk we consider a supply chain planning problem where demand occurrences are for kits (a group of items). The item that will be used from the kit is not known in advance and the whole kit has to stay at the demand site for the whole duration. The used item is replenished through a supply system, with possible capacity limitation. We obtain optimal base stock levels under certain supply and capacity structures, and report simulation findings.

SB07

S-Sung II

Issues in Strategic Planning

Contributed Session

Chair: Shuo-Yan Chou, Professor, National Taiwan University of Science & Technology, 43 Keelung Road, Section 4, Taipei, TW, Taiwan, sychou@im.ntust.edu.tw

1 - Strategic Plan Development with Balanced Scorecard and Process Management

Deniz Kasap, Researcher, The Scientific and Technological Research Council of Turkey, Tubytaktossyde Gebze-Kocaeli, Istanbul, Turkey, dkasap@tusside.gov.tr

Institutions are challenged to improve their performance to survive in today's business environment. A proposed methodology aims to effectively measure organizational performance and implement strategies for achieving competitive advantages in today's market, while simultaneously improving the performance of the processes, evaluating the reliability of processes and if necessary, developing new processes depending on the performance measures and strategies driven by the vision and mission.

2 - Multinational Bargaining in Eurasian Gas Supply Network: Strategic Coalitions, Investments, Hold-Up

Svetlana Ikonnikova, PhD, Humboldt University of Berlin, Ziegelstr 13a, Berlin, 10437, Germany, sveticon@web.de

We analyze investment in gas supply network as two-stage coalitional bargaining game. Russia, Turkmenistan produce; Ukraine, Belorussia, Azerbaijan transit gas. First countries cooperate to invest. Then producers form coalitions to transport gas and bargain over profit sharing. Balance in bargaining power explains: underinvestment in cheap transit links, overinvestment in expensive outside options; alliance of producers; delay in TransCaspian project, building of NorthEuropean pipeline.

3 - Define Strategic Initiatives By Aligning Strategic Outcomes With Associated Benefits And Outputs

Kersti Nogeste, Principal Consultant, Project Expertise Pty Ltd,
P.O. Box 464, Collins Street West, VI, 8007, Australia,
knogeste@projectexpertise.com.au

Stakeholders can define strategic initiatives by using Outcome Profiles to align expected strategic outcomes with associated benefits, outputs, beneficiaries, the benefits realisation schedule, roles and responsibilities, success criteria, assumptions, dependencies, risks and financials. Outcome Profiles are based on a combination of project management and benefits management principles and processes and ensure that strategic initiatives are aligned to expected strategic outcomes.

4 - Vendor Selection Using a Strategy-aligned Fuzzy Approach

Shuo-Yan Chou, Professor, National Taiwan University of Science & Technology, 43 Keelung Road, Section 4, Taipei, TW, Taiwan,
syzhou@im.ntust.edu.tw, Chun-Ying Shen

Existing solution approaches ignore the compliance with the strategies of the firm and the essence of the manager's job for the vendor selection problem. In this study a strategy-aligned fuzzy approach is proposed in which quality function deployment and balanced scorecard are integrated in a judgmental evaluation process. The decision-maker identifies judgmental coefficients based on the risks of the supply to accommodate the differences among vendors to specific environment.

SB08

S-Ching

Applications of Data Envelopment Analysis

Contributed Session

Chair: Dany Vyt, PhD Student, University of Rennes 1, 11
Rue Jean Macé, Rennes, 35700, France, dany.vyt@univ-rennes1.fr

1 - DEAS: Data Envelopment Analysis System, A New Software for the Improvement of Decision-making

Monique Le Moing, Engineer, INRA, Economie,
4 Allée Adolphe Bobierre, CS 61103, Rennes, 35011, France,
Monique.LeMoing@rennes.inra.fr, Isabelle Piot-Lepetit

Version 1.0 of DEAS, is an easy-to-use software to perform productivity and efficiency measurements. DEAS using the technique known as Data Envelopment Analysis (DEA), provides a wide range of basic DEA models. Furthermore, this free package implements the most recent developments of the method (Undesirable Outputs, Directional Distance...). The kernel for solving Linear Programs takes advantage of one extremely efficient interior-point algorithm.

2 - Efficiency Measurement of Rice Farms in Kangwon Province using Data Envelopment Analysis

Jong Moo Kim, Professor, Sung Kyun Kwan University,
3-53 Myungryun-Dong, Jongro-Ku, Seoul, 110-745, South Korea,
jongmoo2003@yahoo.co.kr

The efficiency scores of 52 rice farms in Kangwon Province have been estimated using Data Envelopment Analysis with special reference to input-oriented constant(CRS) and variable return to scale(VRS) models. There is a higher level of efficiency scores in the sample farm distribution using the VRS model than in the CRS model. It was found that the correlation coefficient between the CRS and VRS models was similar for both output and input materials.

3 - Incorporating the Impacts of Supermarket Characteristics in the Measurement of Retail Efficiency

Dany Vyt, PhD Student, University of Rennes 1, 11 Rue Jean
Macé, Rennes, 35700, France, dany.vyt@univ-rennes1.fr,
Isabelle Piot-Lepetit

The measurement of retail efficiency is of significant concern today mainly for supermarkets. This paper provides definition and conceptual framework to this problem in a way that integrates store characteristics and local factors. It gives some information on the set of unpriced distribution services that supermarkets provide to consumers and on the impact on the purchase activities. An application is implemented on a sample of French supermarkets retail at the product level.

4 - Score Maximization versus Rank Minimization in DEA

Woan-Ling Tsai, National Taipei University of Technology, 1, Sec.
3, Chung-Hsiao E. Road, Taipei, Taiwan, s4488002@ntut.edu.tw,
Jung-Fa Tsai

Pursuing the best ranking is more important than maximizing the individual score. Although data envelopment analysis (DEA) is a well-known method for evaluating the performance of decision making units (DMUs), the best performance for each DMU obtained with DEA models may not represent its best ranking among all DMUs. This study proposes a novel method for optimizing the ranking for each DMU. Examples are presented to illustrate the difference between the proposed and DEA models.

SB09

S-Ming I

Scheduling and Logistics

Cluster: Scheduling

Invited Session

Chair: Andrew Wirth, Department of Mechanical and Manufacturing Engineering, University of Melbourne, wirtha@unimelb.edu.au

1 - A Search Algorithm for Scheduling Container Transfers at Seaport Terminals

Erhan Kozan, Queensland University of Technology, G.P.O. Box
2434, Brisbane, Q, 4001, Australia, e.kozan@qut.edu.au

A scheduling model is developed taking into account factors such as handling equipment, labour resources, storage capacities and terminal layout. An iterative search algorithm is developed to deal with the intractability. Analyses of different resource levels and a comparison with current practice will be presented.

2 - Integration of Train Timetables and Track Maintenance Schedules

David Panton, School of Mathematics & Statistics, University of
South Australia, Australia, David.Panton@unisa.edu.au,
Amie Albrecht

We describe two methods for integrating train timetables and track maintenance schedules for a rail network. First we use a meta-heuristic called Problem-Space Search to find different solutions by making small perturbations to the data. Second we use a traditional set covering formulation where each column corresponds to a particular train path or track maintenance configuration.

3 - Applying Distributed Optimization Techniques to Logistics Problems

Simon Dunstall, Division of Mathematical and Information
Sciences, CSIRO CMIS Division, Private Bag 10, CSIRO, VI, 3169,
Australia, Simon.Dunstall@csiro.au

We first present a series of results and observations pertaining to some of the fundamental research questions associated with distributed optimization in the transport and logistics area. We then examine real-world case studies in which we have applied distributed optimization techniques, and we describe our solution approaches.

4 - Some On-line Scheduling Problems

Andrew Wirth, Department of Mechanical and Manufacturing
Engineering, University of Melbourne, wirtha@unimelb.edu.au,
Kwanniti Khammunag

We study the worst-case and in mean performance of list scheduling for the on-line single machine flowtime minimization problem. Next, the single machine with forbidden zones and the crane scheduling with non-crossing constraints problems, are investigated. The performance of several heuristics is evaluated by competitive analysis as well as simulation.

SB10

S-Ming II

Applications of Optimization II

Cluster: Mathematical Programming/Optimization

Joint Invited/Sponsored

Chair: Tim (Carl) Kelley, NC State University, Department of
Mathematics, Box 8205, Raleigh, NC, 27695-8205, United States,
tim_kelley@ncsu.edu

1 - Maximizing Revenue for a Stock of Perishable Commodity Following Market Price & Delivery Restriction

X. Li, Assistant Professor, National University of Singapore, Dept.
of Math, 2 Science Drive 2, 117543, Singapore, matlx@nus.edu.sg

We consider a problem of maximizing revenue from marketing a perishable commodity or its production capacity that is to be utilized at a pre-specified time. This problem can be generalized into a set of multiple correlated commodities such as a gas storage and an electricity generator.

2 - A Power Penalty Method for Two-Asset American Option Pricing

Kai Zhang, The Hong Kong Polytechnic University,
The Hong Kong Polytechnic University, Hong Kong, HK,
Hong Kong, 03901667r@polyu.edu.hk, Xiaoqi Yang, Song Wang

This paper is devoted to develop a power penalty method for pricing the two-asset American option models, which results in a high dimensional nonlinear parabolic PDE. The corresponding variational analysis is carried out. Convergence rate of the power penalty method is established. Moreover, for the nonlinear PDE, a novel fitted volume method is proposed to solve the nonlinear PDE. Finally, numerical tests are performed to illustrate the efficiency of our new method.

3 - On the Tax Effect of Price of Anarchy for Multi-class, Multi-criteria Traffic Equilibrium

Deren Han, Nanjing Normal University, School of Mathematics, and Computer Science, Nanjing, JS, 210097, China, handr00@hotmail.com

Consider a traffic equilibrium problem where there are a class of users with a discrete set of value of time. We examine the efficiency of the taxes by establishing the bound for the price of anarchy when the levied taxes are also considered as part of the cost functions. We show that the price of anarchy will be smaller than that of the original network without taxes, showing the desirable performance of the optimal taxes.

4 - A Successive SDP/NSDP Algorithm for the Solution of a Robust Optimization Problem in Finance

Jan Maruhn, University of Trier, FB 4 - Department of Mathematics, University of Trier, Trier, 54286, Germany, maruhn@uni-trier.de, Friedemann Leibfritz

The robustification of trading strategies against model errors is of particular interest in financial market applications. In the case of barrier options, we show that the resulting optimization problem can be solved by a sequence of linear and nonlinear semidefinite programs (SDP/NSDP), where the nonlinearity is introduced by the parameters of a parabolic differential equation. Further we prove convergence for the iterates generated by the sequential SDP-NSDP approach.

SB17

H-Crystal Room 1

Transportation and Traffic Assignment Models

Contributed Session

Chair: Chawalit Jeenanunta, Dr, Sirindhorn International Institute of Technology, Thammasat University, 131 Moo 5 Tiwanont Rd., Bangkok, Muang, Pathumthani, 12000, Thailand, chawalit@siit.tu.ac.th

1 - The Traffic Equilibrium Problem with Nonadditive Costs and Its Monotone MCP Formulation

Rhoda Agdeppa, Department Of Applied Mathematics and Physics, Graduate School of Informatics, Kyoto University, Yoshida Honmachi, Sakyo-ku, Kyoto, 606-8501, Japan, rhoda@amp.i.kyoto-u.ac.jp, Nobuo Yamashita, Masao Fukushima

We consider a traffic equilibrium problem (TEP) whose route cost functions are nonadditive disutility functions of time (with money converted to time). We show that the TEP with the disutility functions can be reformulated as a monotone Mixed Complementarity Problem under appropriate conditions. We then establish the existence and uniqueness result for an equilibrium of the TEP. Numerical experiments are carried out using various sample networks with different disutility functions.

2 - Convergence and Stability Properties of Simulation-based Dynamic Traffic Assignment Models

Ta-Yin Hu, National Cheng Kung University, No.1 Ta-Hsueh Road, Tainan, Taiwan, tyhu@mail.ncku.edu.tw, Li-Wen Chen, Pai-Hsien Hung

Simulation-based Dynamic Traffic Assignment (DTA) models have been developed for dynamic flow estimation under ITS. Two critical issues for convergence and stability of such models are (1) how paths are assigned to vehicle flows and (2) how average link cost and marginal link cost are calculated. In this research, several flow averaging methods and cost calculation methods are examined and experimented numerically through DYnaTAIWAN, a simulation-assignment model for mixed traffic flows.

3 - A Study of Dantzig-Wolfe Decomposition for Asymmetric Traffic Assignment Problems

William Chung, Assistant Professor, City University of Hong Kong, Kowloon Tong, mswchung@cityu.edu.hk, J. David Fuller

In this paper, we study the use of Dantzig-Wolfe decomposition method to solve Asymmetric Traffic Assignment Problems. By adding dummy variables for linking constraints, the problem can be decomposed into a master problem (an asymmetric TAP) and a subproblem (a symmetric TAP). We also discuss the similarity of the use of Dantzig-Wolfe decomposition and Simplicial Decomposition method for asymmetric TAPs. A valid stopping condition is derived and an illustration is provided.

4 - Mode Choice Through Shortest Path Algorithm

Chawalit Jeenanunta, Dr, Sirindhorn International Institute of Technology, Thammasat University, 131 Moo 5 Tiwanont Rd., Bangkok, Muang, Pathumthani, 12000, Thailand, chawalit@siit.tu.ac.th, Sakib Jalil

We consider a Discrete Choice Model. We propose to utilize a label-constrained shortest path algorithm in such a way that it will find the minimum utility cost route that complies with the specified modes. The search for the route will be done simultaneously on all of the modal layers of networks that satisfied the required modes. A primary objective is to formulate the appropriate utility function as a function of travel mode, travel time, travel cost and demographic characteristics.

SB18

H-Crystal Room 2

Vehicle Routing Problem II

Contributed Session

Chair: Ching-Wu Chu, Professor, Dept. of Shipping and Transportation, National Taiwan Ocean University, 2 Pei Ning Road, Keelung, 202, Taiwan, cwchu@mail.ntou.edu.tw

1 - An ACO Based Heuristic for Bus Routing

Shrikrishna Shrin, Student, IIT Kharagpur, A-211, R.K Hall of Residence, Kharagpur, 721302, India, shrikrishna.shrin@gmail.com, Chetan Mehta, Nitin Garg

Although we have sophisticated means of transport such as metros, monorails etc. buses still remain a widely used cost effective means of transporting people. We in this paper propose a heuristic for bus routing depending on the existing routes, length of route and customer demand, borrowing the basic principles from Ant Colony Optimization.

2 - Applying Genetic Algorithm Approach for Vehicle Routing Problems with Time Windows

Shih-Wei Lin, Assistant Professor, Huaan University, No. 1, Huaan Rd., Shihing Hsiang, Taipei Hsien, 223, Taiwan, swlin@cc.hfu.edu.tw

This research uses the genetic algorithm combined with greedy local search for solving the vehicle route problems with time windows (VRPTW). The Solomon's benchmark instances are used for testing the developed approach. The result shows that the developed approach can be used to solve the VRPTW effectively.

3 - Model and Solution Framework for Maximum Profit Dynamic Vehicle Routing Problems

Ming-Der May, Assistant Professor, Dep. of Industrial Management, Lunghwa University of Science and Technology, No.300, Sec. 1, Wanshou Rd., Gueishan Shiang, 333, Taiwan, mdmay@mail.lhu.edu.tw

This study proposed a maximum profit formulation, instead of minimum cost objective function like most researches for Dynamic Vehicle Routing Problem, and an on-line optimization framework to solve with the commercial solver, ILOG CPLEX and OPL. The dynamic data structure for newly arrived request has been developed to fulfill the requirement of on-line computing. The on-line test problems modified from the benchmarks in literature are given to evaluate performance of this solution approach.

4 - Particle Swarm Optimization in Vehicle Routing Problems with Time Windows

Zhu Qing, Tsinghua University, Tsinghua University 35-109, Beijing, China, zhuqing04@mails.tsinghua.edu.cn

This paper introduces a proposal to extend the heuristic called "Particle Swarm Optimization" (PSO) to deal with the Vehicle Routing system with Time Windows. Experimental results indicate that the PSO can effectively and quickly get optimal resolution of VRPTW, so it is proved to be an effective method. We provide a numerical experiment to show the effectiveness of the heuristic and the value from a rationing policy.

5 - A Heuristic Algorithm Integrating Vehicle Routing Problem with Pickup and Delivery and Selecting Outside Carriers

Ching-Wu Chu, Professor, Dept. of Shipping and Transportation, National Taiwan Ocean University, 2 Pei Ning Road, Keelung, 202, Taiwan, cwchu@mail.ntou.edu.tw, Peter Zhang

In this paper, we address the problem of routing a fixed number of trucks with limited capacity from a central warehouse to customers with known demand. The objective of this paper is developing a heuristic algorithm to route the private trucks with simultaneously pickup and delivery and to make a selection of less-than-truckload carriers by minimizing a total cost function. Both the mathematical model and the heuristic algorithm are developed. Finally, some computational results and suggestions for future research are presented.

■ SB19

H-Crystal Room 3

Decision Making Methods

Contributed Session

Chair: Hing-Po Lo, Associate Professor, City University of Hong Kong, Department of MS, Hong Kong, mshplo@cityu.edu.hk

1 - Technology Scoring Model for Reflecting Evaluator's Perception within Confidence Limits

Tae Hee Moon, PhD. card., Yonsei Univ, Shichondong 134, Seoul, South Korea, mthstat@yonsei.ac.kr, So Young Sohn

Wildly used scorecards for technology owned SME usually consist of many attributes with judgmental weights associated with. When the relationship between the score of these attributes and the loan default result is empirically investigated, this brings the perception phenomenon. This paper provides a new technology scoring model by appropriately controlling the point estimator of the logit model when forecasting the probability of default using objective attributes.

2 - Grouping Branches and Getting Differential KPI with the Circumstances Data of Branches

Se Kyoung Youm, Dongguk University, Dongguk University, Pildong 3ga, JungGu, Seoul, South Korea, skyoum@dgu.edu, Sung Ku Cho, Kyoung Won Heo

Current banks are applying simple index to evaluate accomplishment of each branch. In advanced banks, they evaluate accomplishment through simple index and grouping branches relevantly. Therefore, this study collects the circumstances of branches of 'P'bank, groups 121 branches using 'Clustering'. The result was verified by investigation of each branch. In addition, this study established the process to make evaluation index and KPI with the circumstances of each branch through BSC.

3 - A Fuzzy Multi-Attribute Decision Making Method Based on Concordance and Discordance Test

Sun ShiYan, Navy University of Engineering, School of Electronic Engineering, Wuhan, China, ssy975119@163.com

A new fuzzy ELECTRE method is proposed considering uncertain input information in multi-attribute decision making. The concordance index, accords with the facts of fuzzy decision making system. Through this way, some disadvantages are overcome, such as alternatives are difficult to rank when ELECTRE method meets fuzzy numbers.

4 - Monte Carlo Experiments on the Robustness of AHP and a New Error-Detection Algorithm

Ralf Wagner, Dr., University of Kassel, Moenchebergstr. 17, Kassel, 34125, Germany, rrwagner@wirtschaft.uni-kassel.de, Soeren W. Scholz, Martin Meissner

Referring to Thurstone's law of categorical judgment we investigate the impact of random errors as well as ambiguities in preference statements in the AHP. We demonstrate the linear relationship between the standard deviation of errors and the Consistency Ratio Index. Moreover, a new error detection algorithm is outlined which investigates the reciprocal matrix of stated pair-wise comparisons to identify deficient elements and excludes these from the computation of preference weights.

5 - A Study of the Two-Envelope Tendering System in Competitive Bidding

Hing-Po Lo, Associate Professor, City University of Hong Kong, Department of MS, Hong Kong, mshplo@cityu.edu.hk

The use of two-envelope system in bidding has become very popular nowadays. This paper examines the level of acceptance of this new system in the construction industry in Hong Kong. Based on the assumption that quality score and tender-price score from the two envelopes are correlated, this paper proposes a method to determine appropriate weightings for the two scores and develops a bidding strategy for contractors.

■ SB20

H-Jade Suite 1

Risk Management in Public and Private Sectors

Contributed Session

Chair: Ningxiong Xu, Research Associate, Cornell University, School of Civil and Environmental Engineering, Hollister Hall, Ithaca, NY, 14853, United States, nx22@cornell.edu

1 - On COSO's Enterprise Risk Management (ERM) Framework

Chaiho Kim, Professor, Santa Clara University, 500 El Camino Real, Santa Clara, CA, 95053, United States, ckim@scu.edu

COSO's 1992 Internal Control Framework is widely adopted by US companies as a model for their internal controls. In 2004, COSO issued its Enterprise Risk Management (ERM) Framework which may play an important role for these companies in managing their enterprise risks. We will examine the underlying conceptual model of ERM as it relates to the traditional risk analysis framework.

We will also explore the problems that corporations may encounter in implementing ERM in its entirety.

2 - The Effect of Correlation on Entropy-based Distribution Functions

Jay Rajasekera, Professor, International University of Japan, Kokusai Cho, Minamiuonuma City, 949-7277, Japan, jrr@iuj.ac.jp, Naoya Takezawa

Maximum Entropy Models are often used in practical applications to infer the forms of distribution functions with best available data. In this paper we present a model to incorporate the effect of correlation and analytically link it to the underlying distribution function through the use of duality theory. The model, while extending previous work on asset valuation, has potential applications in risk estimation and in interpreting key theoretical concepts.

3 - Robust Optimization to Identify Regional Earthquake Mitigation

Ningxiong Xu, Research Associate, Cornell University, School of Civil and Environmental Engineering, Hollister Hall, Ithaca, NY, 14853, United States, nx22@cornell.edu, Rachel Davidson, Linda Nozick, Atsuhiko Dodo

A model to optimize investment in regional earthquake mitigation strategies is developed under uncertainty. The key uncertainty is which earthquake events will occur and when. This structure provides an explicit mechanism to trade-off expected impacts against rare but severe consequences. We conclude with a case study from Los Angeles County.

Sunday, 1:30pm - 3:00pm

■ SC01

S-Tang I

Panel Discussion: New Challenges and Trends in Quality, Statistics, and Reliability Research

Cluster: Quality, Statistics and Reliability - Joint Invited/Sponsored

Chair: Fugee Tsung, HKUST, IELM, Clear Water Bay, Kowloon, HK, Hong Kong, season@ust.hk

1 - Panel Discussion: New Challenges and Trends in Quality, Statistics, and Reliability Research

Moderator: Fugee Tsung, HKUST, IELM, Clear Water Bay, Kowloon, HK, Hong Kong, season@ust.hk, Panelists: Way Kuo, Distinguished Professor and Dean of Engineering, Univ. of Tennessee; Vijay Nair, Professor and Chair, Univ. of Michigan; Jan Shi, Professor, Univ. of Michigan; Kwok Tsui, Professor, Georgia Tech.

This panel will invite several international research leaders in the quality, statistics, and reliability (QSR) area to share their reviews on new challenges, methodologies, and visions in QSE research.

■ SC02

S-Tang I

Joint Session Data Mining/QSR

Cluster: Data Mining & Knowledge Recovery -

Joint Invited/Sponsored

Chair: Philip Chan., plychan@hkucc.hku.hk

1 - Applying Survival Analysis in Personal Sector Financial Applications

Lyn C. Thomas, Professor, School of Management, The University of Southampton, School of Management, The University of Southampton, Southampton, Ni, SO17 1BJ, United Kingdom, L.Thomas@soton.ac.uk

Credit Scoring has proved outstandingly successful in underpinning the growth in the personal finance sector. Changes in objective, in regulations and in market conditions in this sector have now set new challenges for the modellers. We show how using survival analysis ideas one can extend existing models to ones that deal with profit scoring, acceptance scoring, collection scoring and allow incorporation of economic effects into purchase and default models.

2 - Data Mining on the Correlation of Asset Allocation and Personal Financial Management

Shuhuei Hsieh, Lecturer, Lan-yang Institute of Technology, No.79, Fusing Rd., Toucheng Township, Yi, 1F., No.2, Lane 473, Jhongjheng Rd., Yon, Taipei, Taiwan, shuhsieh@mail.fit.edu.tw, Gwo-Hshiung Tzeng, Jhieh-Yu Shyng

Nowadays, people desire to have enough fortune to satisfy the current life and succeeding retirement life as a major desire. There have multi-criteria problems among satisfaction of asset allocation and personal financial management that we can not solve and need using scientific way to find the solution. A questionnaire of Taiwan area in this study, explore the correlation to make a help.

3 - Condition-based Maintenance Using Oil Analysis Data

Burairah Hussin, School of Accounting, Economics and Management Science, Salford University, Manchester, United Kingdom, bhussin74@yahoo.com

This research investigates the use of oil monitoring data for predicting the residual life of a diesel engines used in ships. The main objective is to develop a maintenance decision models in which will assist the maintenance managers to make decisions regarding maintenance problems such as determining whether to repair or not and when to repair the item monitored. A development of an estimation of a residual life distribution given their measured condition monitoring data is shown.

4 - GMDH Identification Models of Chinese Listed Company's Financial Reports Fraud

Hong Qiao, Graduate Student, Sichuan University, Chengdu, China, Joeanna_1@126.com

It is always a hot point to how to identify effectively financial reports fraud in the accounting of research. According to the contrast of the financial index of these listed companies in China having appearance of skulduggery during 1996-2005, by advanced data mining technology based on the method of GMDH(Group Method of Data Handling)(c), this paper establishes GMDH models in order to identify skulduggery of financial reports.

SC03

S-Ballroom A

Land Transportation

Contributed Session

Chair: Narayan Rangaraj, Professor, Indian Institute of Technology - Bombay, IEOR, IIT - Bombay, Powai, Mumbai, 400076, India, narayan.rangaraj@iitb.ac.in

1 - A Branch And Bound Algorithm For Scheduling Trains in a Railway Network

Marco Pranzo, Università di Siena, via Roma, 56, Siena, SI, 53100, Italy, pranzo@dii.unisi.it, Dario Pacciarelli, Andrea D'Ariano

This talk discusses the train re-scheduling problem faced by railway managers in real-time. When train operations are perturbed, a new conflict-free timetable needs to be re-computed. The problem is modeled as a huge job shop scheduling with blocking constraints. A branch and bound algorithm is developed and implication rules enable to speed up the computation. A test on the Dutch rail network shows that the algorithm provides proven optimal or near optimal solutions within strict time limits.

2 - An Integrated Approach to Automatic Load-Mode Switching

Xiaoqing Sun, Sr. Engineer, Schneider National, 3101 South Packerland Drive, P.O. Box 2545, Green Bay, WI, 54306-2545, United States, sunp@schneider.com, Ted Gifford

Schneider National operates many modes of freight transportation and operations are highly dynamic. The mode of a load is some times switched to better match demand and resources. At any time thousands of loads are subject to switch. Loads are not switched one at a time because of network impact. Combining Bender's cuts and network value functions, the proposed approach automatically makes "optimal" load-mode switching decisions. It has potential to save company millions of dollars.

3 - Applying Path Counting Methods for Evaluating the Connected Stability of the Road Network System

Brian Gozun, National Graduate Institute for Policy Studies, 7-22-1 Roppongi, Minato-ku., Tokyo, 106-8677, Japan, d0307@stu.grips.ac.jp, Hozumi Morohosi, Tatsuo Oyama

We apply Path Counting Methods (PCM) for evaluating the connected stability of the road network system which implies the importance of road segments in Metro Manila. The results show that PCM is an effective tool in estimating the strength of connectivity of the road network system.

4 - Impact of Signal Failures on Capacity and Timetabling in Suburban Railway Operations Management

Narayan Rangaraj, Professor, Indian Institute of Technology - Bombay, IEOR, IIT - Bombay, Powai, Mumbai, 400076, India, narayan.rangaraj@iitb.ac.in, Ravindra Gokhale, Hemachandra N

In high-density suburban rail operations, signaling equipment failures heavily influence customer service measures and costs. Using illustrative data from suburban railway operations in Mumbai, we demonstrate how to assess the impact of signal and other failures on line capacity and timetabling, using statistical estimation, simulation and other tools. Multiple performance measures related to timetabling are explored in the study.

SC04

S-Ballroom B

Asymptotic Analysis of Stochastic Network

Cluster: Stochastic Models of Logistics & Supply Chain
Invited Session

Chair: Hengqing Ye, Assistant Professor, National University of Singapore, 15 Law Link, BIZ1, Singapore, SG, 129790, Singapore, bizyehq@nus.edu.sg

1 - Heavy Traffic Limit Theorems for a Queue with Poisson ON/OFF Long Range Dependent Sources

Wanyang Dai, Professor, Nanjing University, Nanjing, Nanjing, China, nan5lu8@mail.nju.edu.cn

Heavy traffic limit theorems are established to provide suitable approximations for a queue with Poisson ON/OFF long-range dependent sources and general service time distributions when the number of input sources tends to infinite. Both ON and OFF periods can be heavy-tailed with infinite variance. The weak limit is justified to be reflecting fractional Brownian motion or certain type of reflecting long-range dependent Gaussian process depending on the choice of scaling.

2 - Positive Harris Recurrence of Re-entrant Lines with Infinite Supply

Hanqin Zhang, Institute of Applied Mathematics, Academy of Mathematics and Systems Science Chinese Academy of Sciences Beijing, 100080, China, hanqin@amt.ac.cn, Yongjiang Guo

Re-entrant lines with infinite supply are considered in this paper. We prove that the Markov process describing the dynamics of a re-entrant line with infinite supply under static buffer priority discipline is positive Harris recurrent if the corresponding fluid model is stable. As an application of the result, under two special disciplines, infinite FBFS and infinite LBFS, we give sufficient conditions for stability of the corresponding fluid models.

3 - Poisson Hypothesis for Information Networks

Alexandre Rybko, Research Scientist, Russian Academy of Sciences, Dobrushin Laboratory, Institute for the, Moscow, RU, Russia, rybko@iitp.ru

We study the Poisson Hypothesis, which is a device to analyse approximately the behavior of large queueing networks. We prove it in some simple limiting cases. We show in particular that the corresponding dynamical system, defined by the non-linear Markov process, has a line of fixed points which are global attractors. To do this we derive the corresponding non-linear equation and we explore its self-averaging properties.

4 - Heavy Traffic Optimality of Network under Utility Maximizing Control

Hengqing Ye, Assistant professor, National Univ of Singapore, 15 Law Link, BIZ1, Singapore, SG, 129790, Singapore, bizyehq@nus.edu.sg, David Yao

We study a stochastic network that consists of a set of servers shared by multiple classes of jobs. Each class of jobs requires a concurrent occupancy of several servers while being served for a random amount of time. The allocation of the server capacities among the job classes takes the form of a solution to an optimization problem that maximizes a given utility function of the dynamic network state. We study the optimality of such control when applied to networks under heavy traffic.

SC05

S-Ballroom C

Game-theoretical Models in Supply Chains

Cluster: Supply Chain Models
Invited Session

Chair: Greys Sosis, Assistant Professor, Marshall School of Business, University of Southern California, Bridge Hall 401, Los Angeles, CA, 90089, United States, sosis@marshall.usc.edu

Co-Chair: Mahesh Nagarajan, mahesh.nagarajan@sauder.ubc.ca

1 - Inventory Assortment and Substitution Problems

Yehuda Bassok, Professor, University of Southern California, Marshall School of Business, IOM department, Los Angeles, CA, 90089, United States, bassok@marshall.usc.edu, Feng Chen

We consider general substitution problem in which consumers can choose one of N variants. We start with a choice model that ranks the preference of each consumer. These preferences are not known to the retailer, thus he must assume that the demand for each variant is random. We are able to calculate the retailer's optimal stocking policy. We show that the role of safety stock is to hedge against the uncertainty in the market size but not the uncertainty in the demand for each of the variants.

2 - Stability of Information-Sharing Alliances in a Three-Level Supply Chain

Greys Sotic, Assistant Professor, Marshall School of Business, University of Southern California, Bridge Hall 401, Los Angeles, CA, 90089, United States, sotic@marshall.usc.edu

We analyze a three-level supply chain, consisting of a supplier, a manufacturer, and a retailer, which faces a nonstationary end demand. Supply chain members can share demand information, which reduces information distortion and thus decreases their inventory holding and shortage costs. We distribute the savings from information sharing among the supply chain members according to Shapley value, and we use these allocations to determine farsighted stable information-sharing alliances.

3 - Coordinating Efforts of Multiple Retailers in a Decentralized Supply Chain

Stephen Shum, MIT, 77 Massachusetts Avenue, Bldg E40-130, Cambridge, MA, 02139-4307, sstephen@MIT.EDU, David Simchi-Levi

In many supply chains, retailers invest in advertisement or other types of effort to influence customer demand. This costly effort engaged by a retailer may increase or decrease the demands of other retailers. We study the impact of effort in a supply chain with multiple retailers. We show that traditional contacts coordinate the supply chain only under some very restrictive conditions. We propose revenue sharing with fixed target sales rebate. Interestingly, similar contracts have been used extensively in the fresh food industry to motivate retailers to promote the products.

■ SC06

S-Sung I

Operational Control of Multi-Echelon and/or Multi-Item Stochastic Production/Inventory Systems

Cluster: Operations Management
Invited Session

Chair: Mustafa Kemal Dogru, Postdoctoral Researcher, Lucent Technologies-Bell Labs, Blanchardstown Industrial Park, Blanchardstown, Dublin, 15, Ireland, dogru@lucent.com

1 - Inventory Control in Market Based Supply Chains

Kaj Rosling, Professor, Växjö University, Technology & Design, Växjö, SE, 351 95, Sweden, kaj.rosling@vxu.se

A manufacturer and a retailer that are independent interact in a Stackelberg game on pricing and inventory control. The equilibrium inventory control is studied for either the manufacturer or the retailer leading the game. The equilibriums of both games are not Pareto optimal, but the efficiency losses are smaller than for the corresponding Cournot game, particularly when the retailer leads the game (i.e., when she is the monopolist). Contracts that eliminate the efficiency losses are presented.

2 - Period Order Quantities in Multi-item Multi-echelon Inventory Systems

Ton de Kok, Professor, TU Eindhoven, P.O. Box 513, Paviljoen E4, Eindhoven, 5600 MB, Netherlands, A.G.d.KOK@TM.TUE.NL

In this presentation we propose a class of policies that allows for controlling multi-item multi-echelon inventory systems under lot sizing restrictions. We assume period order lot sizing, so that decisions across the system can be synchronized. The class of policies generalizes the class of Synchronized Base Stock (SBS) policies that assumes a single review period across the system. We present efficient algorithms to compute near-optimal base stock levels for given period order quantities.

3 - Controlling a Repairshop

Rommert Dekker, Professor, Erasmus University Rotterdam, Burg. Oudlaan 50, Rotterdam, ZH, 3062PA, Netherlands, rdekker@few.eur.nl

In this paper we consider the control of a repair shop of rotatable items. In particular we consider two aspects. First we divide the repair up into stages and look at the value of giving feedback on the execution of the repair as well as determining how far one should go with a repair. Secondly, we consider the return time distribution, the repair time distribution and the install base. The latter is based on an empirical study with a company. In both case we look at the effects on inventories.

4 - The Effect of the Balance Assumption in One-Warehouse Multi-Retailer Inventory/Production Systems

Mustafa Kemal Dogru, Postdoctoral Researcher, Lucent Technologies-Bell Labs, Blanchardstown Industrial Park, Blanchardstown, Dublin, 15, Ireland, dogru@lucent.com

The balance (allocation) assumption is an essential presupposition used in the analysis of one-warehouse multi-retailer inventory/production systems under periodic review. All heuristics in the literature are based on some form of the balance assumption. Although utilized extensively, there is not much research that studies the effect of this assumption on the expected holding and penalty

costs. Our study tries to fill this hiatus by determining the precise impact of the balance assumption.

■ SC07

S-Sung II

Strategy, Innovation, New Product Development

Contributed Session

Chair: Keng-Chieh Yang, PhD Student, Institute of Information Management, National Chiao Tung University, 1001, Ta Hsueh Road, Hsinchu, 300, Taiwan, andes@iim.nctu.edu.tw

1 - Simonian Theory of Global Entrepreneurship: The Cases of Microsoft and Formosa Plastics Group

Ping Pete Chong, Academic Research Fellow, Chang Gung University, Taiwan, p.pete.chong@gmail.com, Soushan Wu, Ye-Sho Chen

In this paper we draw upon five seemingly unrelated research topics of Herbert Simon (effectuation, causation, attention management, organizational evolution and nearly decomposable systems, and balancing "we" and "they") and provide a holistic framework of global entrepreneurship. We compare two success cases of global business venture, Microsoft in the west and Formosa Plastics Group in the east. We further compare the entrepreneurial characteristics of the two founders.

2 - Strategy, Organizational Learning and Process Change When Implement Large-Scale Information Systems

Keng-Chieh Yang, PhD Student, Institute of Information Management, National Chiao Tung University, 1001, Ta Hsueh Road, Hsinchu, 300, Taiwan, andes@iim.nctu.edu.tw, ChiaChun Wu, Chyan Yang

This study focuses on the impact of organizational learning and business process with corporate strategy and information systems (IS) strategy. The finding shows that corporate strategy, IS strategy and organizational learning influence the business process change. And corporate strategy and IS strategy also influence organizational learning. We suggest that enterprise may consider its corporate strategy and IS strategy because these strategies will affect organization learning and process change.

3 - A Discussion on the Definition of a Linear Bilevel Programming Solution

Yibing lv, Systems Engineering Institute, Wuhan University, Wuhan, China, lvyibing2001@gmail.com, Zhongping Wan

Chenggen Shi gave a new definition of linear bilevel programming solution and declared the new definition can solve a wider class of linear bilevel programming problems. In this paper, we show that the new definition can't solve a wider class of linear bilevel programming problems and proposes an equivalent condition between the new and the original definitions of linear bilevel programming solution.

■ SC08

S-Ching

Decision Analysis in Finance and Investment

Contributed Session

Chair: Dorothy Fisher, Professor, California State University, Dominguez Hills, 1000 E. Victoria St, Department of IS & OM, Carson, CA, 90747, United States, dfisher@csudh.edu

1 - Anchoring Effects in the Horserace Betting Markets

Shuang Liu, Miss, Centre for Risk Research, School of Management, University of Southampton, Highfield, Southampton, SO17 1BJ, United Kingdom, sh.liu@soton.ac.uk, Johnnie Johnson

Anchoring effects refer to a phenomenon that people make estimates by starting from an initial value and make insufficient adjustments (Tversky and Kahneman, 1974). This study examines the anchoring effects in a real world setting using data from the horserace betting markets. Significant differences in both size and durability of anchoring effects in this risk taking environment are identified, having a range of other factors controlled.

2 - Optimal Investment Decision Based on Real Option: Evidence from China's Listed Firms

Bin Song, Lecturer, Department of Investment, Central University of Finance and Economics, 39, South Colleague Road Haidian District, Beijing, CN, China, songb@cufe.edu.cn, Yaoqi Wang, Zhidong Liu

First, we provide the basic model of optimal investment. Second, we choose an expressway project from Chinese listed firm for empirical analysis. Third, we obtain the trigger value for optimal investment decision. According to the trigger value, the firm should not invest the project at that time. At last, we point out several reasons which maybe limit the employing the optimal investment rule in real world.

3 - Risky Financial Decisions- Determinants of Probability Weighting Functions

Renate Schubert, Professor, ETH Zurich, Weinbergstrasse 35, Zurich, 8001, Switzerland, schubert@wif.gess.ethz.ch, Marc Schuerer, Helga Fehr

When valuing risky prospects, people typically overweight and underweight probabilities. We explore the relationship between probability weights, estimated from investment decisions in a laboratory experiment with monetary incentives, and personal characteristics, elicited by a complementary questionnaire. We show that personality traits and incidental factors like mood states affect the shape of the probability weighting function. Moreover we find significant interactions with gender.

4 - The Overconfident Behaviour of Investors in the Taiwan Stock Market

Shih-wei Wu, PhD student, Centre for Risk Research, School of Management, University of Southampton, Highfield, Southampton, SO17 1BJ, United Kingdom, s.wu@soton.ac.uk, Johnnie Johnson

In financial markets, the concept of investors' overconfidence has been used to explain anomalies in investor predictions and behaviour. The aim of this research is to apply the psychological theories of overconfidence to develop models of investors' behaviour. These models will be used to investigate the degree and nature of investors' overconfident behaviour in the Taiwan stock market.

5 - Impact of FASB Qualitative Characteristics on the Promulgation of SFAS

Steven Fisher, Professor, California State University, Long Beach, 1250 Bellflower Boulevard, Department of Accountancy, Long Beach, CA, 90840- 850, United States, sfisher@csulb.edu, Melody Kiang, Dorothy Fisher

This research effort uses content analysis to analyze the qualitative characteristics captured from the 154 Statements of Financial Accounting Standards (SFAS) issued by the Financial Accounting Standards Board (FASB). The results provide us with an understanding the relative impact of FASB Qualitative Characteristics on the Promulgation of SFAS.

■ SC09

S-Ming I

Modern Scheduling and Applications

Cluster: Scheduling
Invited Session

Chair: Guochun Tang, Institute of Management Engineering, Shanghai Second Polytechnic University, 2360 Jin Hai Road, Pudong New District, Shanghai, 201209, China, gtang@sh163.net

1 - Decomposition Algorithms for Two-machine Flow Shop Problem with Precedence Constraints

Feng Chen, Department of Industrial Engineering and Management, Shanghai Jiao Tong University, Shanghai, 200030, fchen@sjtu.edu.cn

The paper investigates the two-machine flow shop problem with precedence constraints. We first propose a quantity strategy to describe the precedence constraint. Secondly, some heuristics based on the strategy are constructed with worst performance analysis. Finally, computational experiments display that these heuristics are very efficient.

2 - The Structure of Optimal Control Policy for Multi-period Stochastic Inventory Systems with Returned Products

Yongjian Li, Business School, Nankai University, Tianjin, 300071, China, liyongjian@nankai.edu.cn, Jihong Zhang, Jian Chen, Xiaoqiang Cai

We consider the production planning and control problem with product recovery. Both manufactured and remanufactured products are used to satisfy demands. A two-stage inventory model is presented comprising stochastic demand and return. For this model, an optimum solution structure is derived in Simpson (1978), where a model with no setup costs for production, recovery, and disposal, and zero lead times is considered. In our paper, we show that we can also derive the structure of the optimal policy when setup costs are considered for production and disposal activities.

3 - Linear Programming Relaxations for Scheduling with Rejection

Feng Zhang, College of Sciences, Shanghai Second Polytechnic University, 2360 Jin Hai Road, Pudong New District, Shanghai, 201209, China, zhangfeng@ssp.cn, Guochun Tang

We discuss scheduling with rejection, in which the set off jobs may be precedence constrained and each job may have a release time. We obtain several linear programming formulations by using 0-1 variables. Then we present several approximation algorithms by using linear programming relaxations.

4 - Common Deadline Lazy Bureaucrat Scheduling

Guochuan Zhang, Department of Mathematics, Zhejiang University, Hangzhou, 310027, China, zgc@zju.edu.cn, Ling Gai

We focus on the Lazy Bureaucrat Scheduling where all the jobs share a common deadline, which was first considered by Esfahbod et al. (2003). We first show that the worst-case ratio of the algorithm SJF (Shortest Job First) is two under the objective function [min-time-spent], and thus answer an open question. We further present PTASes under the objective functions [min-makespan] and [min-time-spent] respectively.

■ SC10

S-Ming I

Ideas and Applications in Global Optimization

Cluster: Mathematical Programming/Optimization
Joint Invited/Sponsored

Chair: S. Ilker Birbil, Sabanci University, Fac. of Eng. and Nat. Sci., Orhanli-Tuzla, Istanbul, 34956, Turkey, sibirbil@sabanciuniv.edu

1 - An Integrated View of Algorithms for the Generalized Fractional Program

Ruey-Lin Sheu, Professor, Department of Mathematics, National Cheng-Kung University, No.1, Ta-Hsueh Road, Tainan, 701, Taiwan, rsheu@mail.ncku.edu.tw, Hui-Ju Chen

The talk is to compare three basic algorithms available to the generalized fractional program, including the Dinkelbach-type, the interval-type, and a "dual" algorithm. We found that the convergence proofs for the three algorithms can be unified by the same geometrical view which requires to estimate the ratio of slopes of estimated straight lines. We also show other convergence properties which were not shown in the original papers.

2 - Maintaining Feasibility in Multi-point Search Methods

S. Ilker Birbil, Sabanci University, Fac. of Eng. and Nat. Sci., Orhanli-Tuzla, Istanbul, 34956, Turkey, sibirbil@sabanciuniv.edu

In this talk, we discuss several approaches to maintain feasibility in multi-point search methods used for global optimization. The convex feasible regions, in particular the box constraints and the polyhedral sets, are treated separately. The general feasible regions defined by equalities and inequalities require simple bisection-type approaches and more elaborate penalty methods. The talk ends with applications of aforementioned approaches to a recent multi-point search method.

3 - A Global Optimization Approach for Significant Feature Selection in Rule Mining

Kemal Kilic, Asst. Professor, Sabanci University, Orhanli Tuzla, Istanbul, Turkey, kkilic@sabanciuniv.edu

A major phase in the process of extracting the hidden fuzzy if-then rules from the historical data is determining the features that are significant. The available algorithms determine if the input variable is significant or insignificant, dichotomously. However, in reality some variables are more significant than others. Therefore a better approach could be associating a "significance degree" to the features. A global optimization tool is utilized to solve this highly nonlinear problem.

4 - The Design of Optimum Component Test Plans for System Reliability

Orhan Feyzioglu, Assistant Professor, Galatasaray University, Ciragan Caddesi No: 36, Ortakoy, Istanbul, 34357, Turkey, ofeyzioglu@gsu.edu.tr, Suleyman Ozekici, Kuban Altinel

System testing can be economically infeasible or even impossible, and individual component tests are often necessary to predict system reliability. In this study, we investigate series, serial connection of passive redundant, active redundant, k-out-of-n subsystems and mixed systems. Minimum cost component testing problem is formulated as a semi-infinite linear program, and a solution procedure based on cutting plane - column generation technique is developed.

5 - Approximations of Nash Equilibria

Gul Gurkan, Associate Professor, Tilburg University, Warandelaan 2, P.O. Box 90153, Tilburg, 5000 LE, Netherlands, ggurkan@uvt.nl, Jong-Shi Pang

We investigate approximating Nash equilibria and clarify conditions for convergence of approximate equilibria via a direct, a variational, and an optimization approach. Besides directly addressing the issue of convergence of Nash equilibria via approximation, our investigation leads to a deeper understanding of various notions of functional convergence and their interconnections. An illustrative application in a competitive capacity expansion model under uncertainty is presented.

6 - Term Structure Analysis Using Cubic L1 Splines

Shu-Cherng Fang, N.C. State University, Raleigh, NC, United States, fang@eos.ncsu.edu, Jenylen Lin, John Lavery, Yong Wang

Term structure of interest rates plays a central role in economics and finance. The desired term structure is most likely not directly observable, but usually inferred from some observable indices such as bond price. Cubic L1 spline is proposed to approximate the term structure. The curves generated carry minimal oscillations and fitting errors, compared to other spline-based techniques. Comparison is performed on a set of real data.

SC11

S-Boardroom

Workshop: Scenarios for the Future of OR/MS Practice (Part I, continued in SD11)

Cluster: Practice/ORMS in Practice

Invited Session

Chair: Jay Horton, Managing Director, Strategis Partners, 8 Canisius Close, Pymble, 2073, Australia, jay.horton@strategispartners.com.au

Co-Chair: Grace Lin, gracelin@us.ibm.com

1 - Scenarios for the Future of OR/MS Practice Workshop

Jay Horton, Managing Director, Strategis Partners, 8 Canisius Close, Pymble, 2073, Australia, jay.horton@strategispartners.com.au, Grace Lin

The objective for this session is to apply scenario planning to the future of ORMS Practice. Innovation in ORMS is an inherently uncertain process - and this is where scenario-based approaches play a valuable role. Jay Horton will serve as the workshop facilitator and will deliver an introductory paper for this session, entitled - "Exploring the Future of ORMS Practice using Scenario Planning - Operating Instructions". Its purpose would be to explain the process to be followed in this session in order to generate two or three scenarios before the close of the Session. The session will be an interactive workshop involving a diverse mix of 12-20 participants.

SC17

H-Crystal Room 1

Supply Chain Dynamics and the Bullwhip Effect

Cluster: Special Sessions

Invited Session

Chair: Stephen Disney, Senior Lecturer, Cardiff Business School, Aberconway Building, Colum Drive, Cardiff, CF10 3EU, United Kingdom, DisneySM@cardiff.ac.uk

1 - Co-operation and Collaboration in the UK Coinage Industry

TingTing Woo, Logistics Systems Dynamics Group, Cardiff Business School, Cardiff University, Aberconway Building, Colum Drive, Cardiff, CF10 3EU, United Kingdom, TingTingWoo@yahoo.com.cn, Stephen Disney

The UK coinage industry consists of a closed loop supply with new and used coins flowing between the public, retailers, banks, coinage distributors and the Royal Mint. The demand for coins in the UK is seasonal and wastage is often high, especially for the lower denomination coins. Adapting the "Beer Game" to this industry has allowed us to investigate the co-operation and collaboration opportunities available to the industry to ease the burden on the Royal Mint.

2 - Cyclic Demand Problems in the Frequency Domain

R.D.H. Warburton, Associate Professor, administrative Sciences Department, Boston University, 808 Commonwealth Avenue, Boston, MA, 02215, United States, roger@warbs.net, Stephen Disney

Sine waves that may mimic seasonal demand (ice cream, heating oil etc) can be easily handled in the frequency domain. We characterize the ordering policy reaction to the cyclical demand pattern in both continuous and discrete time. Analytical results may be obtained that describe the frequencies at which the (costly) resonances occur. The frequency domain approach also reveals how the system responds to random demands which may be considered to contain all possible frequencies.

3 - The Economics of the Bullwhip Effect

Stephen Disney, Senior Lecturer, Cardiff Business School, Aberconway Building, Colum Drive, Cardiff, CF10 3EU, United Kingdom, DisneySM@cardiff.ac.uk, Frank Chen, W. van de Velde, R.D.H. Warburton, G. Gaalman, Marc Lambrecht, D.R. Towill

The bullwhip effect is a costly supply chain phenomenon. We assume bullwhip related costs consist of lost capacity and over-time costs. We develop an easy to use design method to tune replenishment decisions in the face both of inventory and bullwhip related costs. To illustrate our method we investigate the value

of a lead-time reduction in terms of inventory and capacity costs. We also investigate the economic impact of a common control theory modification to the Order-Up-To policy.

SC18

H-Crystal Room 2

Sea Transportation and Logistics

Contributed Session

Chair: Zhi Cao, National University of Singapore, Engineering Drive 2, E1-#08-20, Singapore, 117576, Singapore, caozhi@nus.edu.sg

1 - Optimising Storage Location at Seaport Container Terminals

Andy Wong, Queensland University of Technology, G.P.O. Box 2434, Brisbane, 4001, Australia, a3.wong@qut.edu.au, Erhan Kozan

Seaport container terminal involves huge capital investment that often runs into hundreds of million dollars. The throughput and efficiency of the terminal are important factors for investment returns. To minimise ship service time, a model is developed in optimising the storage location of containers. Numerical investigations and case studies are provided for demonstrating the quality of solution that may be obtained.

2 - A Review of Decision Problems in Container Terminals

Eleni Hadjiconstantinou, Senior Lecturer, Imperial College, South Kensington, London, LN, sw72az, United Kingdom, e.hconstantinou@imperial.ac.uk, Nang Ma

This review paper intends to provide an overview and a classification of the key decision making problems in container terminal operations based on three different time horizons: strategic, tactical and operational. The main optimization methods and algorithms used to solve these problems are analyzed and presented. The paper will outline current and future trends in this research area and consider an integrated approach in the container terminal operations problem.

3 - Heuristic Algorithms for Load Scheduling Problem of Multiple Yard Crane Systems

Zhi Cao, National University of Singapore, Engineering Drive 2, E1-#08-20, Singapore, 117576, Singapore, caozhi@nus.edu.sg, Der-Hong Lee, Qiang Meng

This paper addresses the load scheduling problem of multiple yard crane systems. The problem is shown to be NP-complete in nature, which makes exact algorithms not applicable for large size problems. A simulated annealing algorithm, a tabu search algorithm and a customized greedy heuristic algorithm are suggested to solve the problem. Numerical experiments have been conducted to compare the performances of the proposed heuristic algorithms.

SC19

H-Crystal Room 3

Information Systems Applications

Cluster: Information Systems and Electronic Commerce

Invited Session

Chair: Patrick Chau, Professor, University of Hong Kong, China, pchau@business.hku.hk

1 - Effects of Knowledge Management Process Activities on Perceived Performance

Yen-Ching Ouyang, National Sun Yat-sen University, Taiwan, lina@center.fjtc.edu.tw, Ting-Peng Liang, Daniel Power

This study explored two major questions: (1) What KM process activities positively impact perceived organization performance? and (2) Do KM process activities have different effects in different industries? The results indicate that activities for documenting, acquiring and creating knowledge positively impact perceived performance and that the type of industry moderates the relationships.

2 - Study of Complex CRM Gateway Employed with Wireless/Wireline for Effectively Applying Event CRM to Small and Medium Sized Enterprises

Seungeong Yang, Department of Industrial Engineering, Dongguk University, 26 Pil-dong, Chung-gu, Seoul, Korea, 100-715, yeod@dongguk.edu, Jongtae Rhee

The CRM System, which maximizes business profits by pursuing a continuous relationship with customers, has been built based on an analytical CRM that sets up a marketing strategy by analyzing customer information. However, on account of the technological development of the Internet and mobile phones, contacts with the customers are being carried out through various channels. Yet, currently, the needs of the customers are not being addressed in a timely manner due to a weak system that cannot immediately deal with customer requests and that customer information is not administered in a systematic manner. Therefore, rather than an offline-focused analytical CRM, it is necessary to concentrate on

the real time CRM that reflects the aspects of the operation CRM or the collaborative CRM. Also, this study plans to develop an Event CRM solution that can satisfy the customers when they want it by systematizing the contact points of the customers that constitute various institutions and channels. The CRM model that this study presents is to support the Event CRM services for all business types against the backdrop of a wireless/wireline environment, and to support small and medium sized companies that are burdened by the information management costs to meet the demand for CRM. In order to present the wireless/wireline integration CRM Gateway Model, the study focuses on the insurance CRM services. When a customer's event arises through various channels such as the Internet, SFA and CTI, the event data is transferred through a standardized form. Then based on this data, the campaign and service is extracted and analyzed with the Event CRM Gateway Engine. And, then a matching immediately occurs between the saved rules and the adequate campaign and services that fit the customers. Finally the information is provided to the customer through the interfaces of the mobile phone or the website.

3 - The Role of Trust in Successful IT Outsourcing: An Empirical Investigation

Cong Qi, University of Hong Kong, laurel@business.hku.hk,
Patrick Chau

This paper will explore the role of trust in successful relationship management, and further in the ultimate IT outsourcing success. The paper will also contribute to the body of knowledge by categorizing trust into two levels—organizational level and individual level, and exploring the effects of interorganizational trust and interpersonal trust on the dependent variables.

■ SC20

H-Jade Suite 1

Queueing & Time Series

Contributed Session

Chair: Ho Woo Lee, Dept. of Systems Management Engineering, Sungkyunkwan University, Su Won, South Korea, hwlee@skku.edu

1 - A Probabilistic Analysis of the Performance of Moving Average Trading Systems

Art Warburton, Faculty of Business Administration, Simon Fraser University, warburto@sfu.ca, Zhe George Zhang

Moving average trading strategies are of interest not only because they are popular with investors but also because they are used to create indices for tracking or capturing hedge fund performance. We provide a formal probabilistic performance analysis of such strategies. The analysis yields a number of predictions, which we test using 22 years of data for 40 different North American futures contracts. We find substantial agreement between predicted and actual behavior.

2 - Analysis of the Queueing System Controlled by Workload and LCFS Discipline

Ho Woo Lee, Dept. of Systems Management Engineering, Sungkyunkwan University, Su Won, South Korea, hwlee@skku.edu, Sang Ahn Kim, Se Won Lee

In this talk, we present the analysis of the M/G/1 queue under the D-policy and LCFS discipline. We first derive the distributions of the queue length and waiting time in the form of probability generating functions and the Laplace-Stieltjes transform. Then we derive the mean performance measures. Lastly we consider a cost structure and obtain the optimal values of D.

Sunday, 3:30pm - 5:00pm

■ SD01

S-Tang I

Statistical Methods in Quality and Reliability

Cluster: Quality, Statistics and Reliability - Joint Invited/Sponsored

Chair: Qianmei Feng, Assistant Professor, University of Houston, E206, Engineering Building 2, Houston, TX, 77204-4008, United States, qfeng@Central.UH.EDU

1 - Modeling and Monitoring of Time-between-events with Control Chart

Jiying Liu, Research Scholar, National University of Singapore, Dept. of Industrial & Systems Engineering, 119260, Singapore, jiylingliu@nus.edu.sg, Min Xie

In this paper some general time-between-events models are studied from the point of view of process monitoring with control chart. Such applications can be found in reliability and equipment monitoring and also in controlling production processes. Time-between-events chart is an effective method. Issues such as modeling time-between-events distribution, parameter estimation and control chart design will be discussed.

2 - Causation Models Based On-line Intervention for Manufacturing Quality Improvement

Judy Jin, Associate Professor, University of Michigan, IOE Dept., Ann Arbor, MI, United States, jhjin@umich.edu

Causation models are used to explicitly describe complex cause-effect relationships among variables in manufacturing processes. It provides unique opportunities for quality improvement by adjusting controllable variables through online intervention, in which the impact of model uncertainty and sensor errors will be addressed for the optimal controller development.

3 - A Decision Theoretic Approach To Multiple Response Optimization

Szu Hui Ng, National University of Singapore, isensh@nus.edu.sg

The characteristics that define the quality and reliability of many products and processes are often multidimensional. A Bayesian decision theoretic approach to modeling and optimization of multiple response systems is presented. Furthermore, the Bayesian model averaging approach is incorporated to account for response model uncertainty. Finally, we consider the follow up question of how to allocate further resources for additional experimentation to improve on the quality level.

4 - Tolerance Optimization through Variance Transmission Equations

Qianmei Feng, Assistant Professor, University of Houston, E206, Engineering Building 2, Houston, TX, 77204-4008, United States, qfeng@Central.UH.EDU, Kailash Kapur

The variation of a process response is typically an aggregate of many variations from components. We discuss three approaches to develop variance transmission equations (VTE) that describe the variance structure between components and the response. The developed VTE is incorporated in a tolerance optimization model to find an economic balance between the quality level and the associated cost. A case study for a passive filter network is used to illustrate the tolerance optimization procedures.

■ SD02

S-Tang I

Fuzzy Mathematics Programming and its Application

Cluster: Fuzzy Sets and Systems

Invited Session

Chair: Bingyuan Cao, Professor, Guangzhou University, School of Math & Inf. Guangzhou U, Guangzhou, gd, 510006, China, bycao@gzhu.edu.cn

1 - Fuzzy Labeling in the Visualization Step for the Measure of Performance in the Self Organizing Map

Tarek M. Hamdani, PhD Student, Assistant, REGIM: Research Group on Intelligent Machines, University of Sfax, National School of Engineers, BP W, Sf, 3038, Tunisia, tarek.hamdani@fsegs.rnu.tn, Adel M. Alimi

In SOM classification, classical labeling assigns a neuron to the class of the majority of its nearest points. In this paper we propose a new fuzzy labeling method for SOM, assigning the neuron to one or several classes and measuring the quality of the unsupervised classification. This technique informs us about the clustering quality relatively to the desired distribution.

2 - A Fuzzy System Approach For Food Preference Evaluation

Saowanee Lertworasirikul, Dr., Department of Product Development, Faculty of Agro-Industry, Kasetsart University, 50 Phaholyothin Rd., Ladyao, Chatuchak, Bangkok, 10900, Thailand, saowanee_98@yahoo.com, Yodyium Tipsuwan, Saksiri Aiemchareon

Food preference evaluation is usually performed by sensory test. However, performing a consumer test by traditional approaches may not be able to appropriately handle the ambiguity in sensory perception and may take a significant amount of time and money. A fuzzy system approach was introduced in this paper to model human sensory on tastes and to evaluate food preference. As shown in simulations, this approach could estimate food preference close to the results from experimental data. This work is partially supported by Faculty of Agro-Industry, Kasetsart University, Thailand.

3 - Minimizing a Linear Fractional Programming Problem with Fuzzy Relational Equation Constraints

Yan-Kuen Wu, associate professor, Department of Industrial Management, Vanung University, 1, Van-Nung Rd., Chung-Li, Taoyuan, 320, Taiwan, ykw@msa.vnu.edu.tw

A linear fractional programming problem subjected to a system of fuzzy relational equations with max-product composition will be studied in this paper. Thanks to the characteristics of fuzzy relational equations with max-product composition, we separate this optimization problem into many traditional linear fractional programming sub-problems. Then Charnes and Cooper's method can be applied for manipulating such problems. A numerical example is provided to illustrate the purpose.

SD03

S-Ballroom A

Logistics

Contributed Session

Chair: Jesse O'Hanley, Research Fellow, University of Oxford,
26 Salisbury Road, Canterbury, CT2 7HH, United Kingdom,
jesse.ohanley@eci.ox.ac.uk

1 - The Power Distribution Model for Supply Chain Cooperator Evaluation

Qiang Zhang, School of Managements and Economics, Beijing
Institute of Technology, Beijing, 100081, China,
qiangzhang@bit.edu.cn, Song Yuan-Tao, Zhou Xiao-guang

It is very important to select supply chain cooperator for a company. An appropriate cooperator selection will give the company a great improvement in production, purchasing, marketing and customer services; otherwise, it will be an obstacle. A company will set up a supply chain cooperator evaluation group to evaluate its present and potential cooperator. The member of the group usually comes from the department of supply, production, marketing, finance, technology, etc. As the different department has different interest, it is important to distribute a proper power to each department. Here will use Shapley value method to make a power distribution model of supply chain cooperator evaluate group, and an example is given at last.

2 - Integrating Procurement, Production and Distribution Model for Manufacturers

Moon-Gil Yoon, Professor, Hankuk Aviation University,
200-1 Hwajun-dong, Koyang-shi, 412-791, South Korea,
mgyoon@hau.ac.kr, Ernst Andreas, Mohan Krishnamoorthy

Most manufacturing firms have focused on managing efficiently their supply chains that purchasing raw materials, producing final products, and supplying them to retailers. This paper addresses an integration of SCM and RM problems in manufacturing systems - specifically, the simultaneous determination of procurement of raw materials, production plan and supply policy for each customer in the circumstance of demand uncertainty.

3 - Minimizing Expected and Worst-Case Coverage Loss

Jesse O'Hanley, Research Fellow, University of Oxford,
26 Salisbury Road, Canterbury, CT2 7HH, United Kingdom,
jesse.ohanley@eci.ox.ac.uk

New formulation and solution techniques are presented for the problem of fortifying key facilities within an existing coverage-type network against long-term losses caused by natural disaster or malicious attack. Both expected-value and worst-case loss objectives are considered, with the later being formulated as a bilevel fortification-interdiction problem. A general decomposition algorithm is also proposed to optimally solve the bilevel program.

4 - An Integrated Decision Scheme for Shipment Integration and Consolidation

Yulai Wan, Chinese University of Hong Kong, Yer Van Hui,
Collin Wong, Lawrence C Leung

Airfreight forwarders are third-party brokers/operators who coordinate and manage cargo shipments for their clients. It is important for forwarders to develop a shipment plan. We propose a three-phase decision scheme for such shipment planning. First, a mixed 0-1 LP model is used to minimize the total shipping cost and generate a set of shipment plans under a deterministic environment. Then, these plans are tested by a simulation, which evaluates the reliability and risk of the shipment plans. Lastly, modification rules are applied to improve the original plan.

SD04

S-Ballroom B

Economics of Supply Chain Management

Cluster: Stochastic Models of Logistics & Supply Chain
Invited Session

Chair: Youyi Feng, Associate Professor, Dept. of SEEM, Chinese
University of Hong Kong, Sha Tin, N.T., Hong Kong SAR, Hong Kong,
yyfeng@se.cuhk.edu.hk

1 - Supply-Demand Contracts and Spot Sales

Youyi Feng, Associate Professor, Dept. of SEEM, Chinese
University of Hong Kong, Sha Tin, N.T., Hong Kong SAR, Hong
Kong, HK, Hong Kong, yyfeng@se.cuhk.edu.hk

We consider a make-to-assembly (MTA) manufacturing system that needs a part to assemble a product. It can purchase the part either in a spot market or through a long-term supply contractual channel supplied by one or a group of the make-to-stock (MTS) systems. We show that there exists a Nash equilibrium points between the suppliers and the buyer to reach a win-win contract.

2 - A Study on Options Hedge against Purchase Cost

Huifen He, MPhil Student, Dept. of SEEM, Chinese University of
Hong Kong, Sha Tin, N.T., Hong Kong SAR, China,
hfhe@se.cuhk.edu.hk

This paper studies a multi-period inventory system that replenishes its stock by ordering one-period forwards and can procure a kind of options contract to hedge price fluctuation on forwards. It turns out that the optimal ordering decisions follow classic (s,S) ordering policies and optimal hedge decisions are either to hedge all the order quantity or hedge nothing. Further, whether an options contract is needed depends on the forwards curve.

3 - Inventory Optimization in a Capacitated Two-stage Production System

Feng Cheng, IBM T.J. Watson Research Center, 1101 Kitchawan
Road, Yorktown Heights, NY, 10598, United States,
fcheng@us.ibm.com

We study a multi-period, two-stage Push-Pull production model with capacity constraints and stochastic demands. An inventory optimization model is developed to minimize the total inventory cost subject to the service level constraints and the production capacity constraints. We present a decomposition algorithm to solve the nonlinear optimization problem.

SD05

S-Ballroom C

Supply Chain Modeling and e-Commerce

Cluster: Supply Chain Models
Invited Session

Chair: Xiaona Zheng, Assistant Professor, The Guanghua School of
Management, Peking University, Beijing, 100871, China,
xzhen@gsm.pku.edu.cn

1 - Exchange of Demand Information Across Retailers in a Supply Chain

Jianghua Wu, Assistant Professor, School of Business, Renmin
University of China, 59 Zhongguancun St, Beijing, 100872,
China, jwu@ruc.edu.cn, Ananth Iyer, Paul Preckel

We study the impact of information sharing across decentralized retailers in a supply chain. We show that, under constant market conditions, the number of retailers may affect their incentives to share information. Specially, we show that there may exist stable coalitions of partial retailers in a 3-retailer game, in which the first two movers form an information exchange group while excluding the third one from joining the group.

2 - e-Fulfillment: Vertical vs. Horizontal Cooperation

Xiaona Zheng, Assistant Professor, The Guanghua School of
Management, Peking University, Beijing, 100871, China,
xzhen@gsm.pku.edu.cn, Jeannette Song, Fernando Bernstein

One of the challenges all Internet retailers face is the e-fulfillment process. One common approach is drop-shipping, in which the Internet store sells products to consumers and ships them directly from the supplier. However, there is an emerging trend where e-tailers direct their demand to traditional retailers (so-called demand referral). While drop-shipping seeks vertical cooperation, demand referral seeks horizontal cooperation. We investigate the virtues and shortcomings of each approach.

3 - Re-Inventing the E-Business Paradigm in China: Models and Applications

Jian Cai, Assistant Professor, Guanghua School of Management,
Guanghua School of Management, Peking University, Beijing, BJ,
100871, China, cai@gsm.pku.edu.cn

This paper discusses the roles that E-business can play in the process of turning the largest manufacturing country into a country with knowledge competency. The research is based on surveys and cases we gathered from several representative state-owned and private companies. Effective models and applications are introduced and discussed to present the new e-business paradigm in the world fast growing economy.

■ SD06

S-Sung I

The Bullwhip Effect, Inventory Fluctuations and Customer Service

Cluster: Operations Management

Invited Session

Chair: Marc Lambrecht, Full Professor, K.U.Leuven, Naamsestraat 69, Leuven, 3000, Belgium, Marc.Lambrecht@econ.kuleuven.be

1 - The Proportional Order-up-to policy and Altruistic Behaviour in a Three Echelon Supply Chain

Taka Hosoda, Lecturer, Logistics and Operations Management, Cardiff Business School, Colum Drive, Cardiff, CF10 3EU, United Kingdom, hosodat@cardiff.ac.uk, Stephen Disney

Assuming AR(1) demand we study a three echelon supply chain that exploits the proportional order-up-to policy to determine replenishments. Three scenarios are considered; a traditional strategy where each player minimises local inventory costs, an altruistic strategy where each player acts to minimise global inventory costs and a hybrid strategy that yields near optimal performance where only one echelon carries the financial and computational burden for the benefit of the whole supply chain.

2 - A Cyclic Demand Produces An Infinite Bullwhip Effect

Roger Warburton, Associate Professor, Boston University, Administrative Science Department, Metropolitan College, 808 Commonwealth Avenue, Boston, MA, 02215, United States, rwarb@bu.edu

We characterize seasonal demand (ice cream, heating oil) by a sine function. We exactly solve the continuous demand and ordering policy equations to determine the inventory's response over time. The Bullwhip Effect is quantified as a function of the demand frequency, and shown to be significant for all practically interesting frequencies: high frequency fashion surges to long-term seasonal effects. The solutions contain resonances, which can lead to an infinite Bullwhip Effect.

3 - The Bullwhip Effect and Material Constraints

Ton de Kok, Professor, TU Eindhoven, P.O. Box 513, Paviljoen E4, Eindhoven, 5600 MB, Netherlands, A.G.d.KOK@TM.TUE.NL

The Bullwhip effect is a well-studied phenomenon. Due to information distortion and transformation delays, small changes in demand are amplified upstream in the supply chain. Most of the papers showing this phenomenon do not explicitly model the upstream material constraints. In this paper we distinguish between orders and shipments. We apply linear allocation policies to a two-echelon divergent supply chain and derive expressions for the amplification factors in both orders and shipments.

4 - Solving the Lead Time Interaction Problem in a Two Echelon Supply Chain under AR(1) Demand

Robert Boute, PhD Student, K.U.Leuven, Naamsestraat 69, Leuven, 3000, Belgium, robert.boute@econ.kuleuven.be, Stephen Disney, Marc Lambrecht, Benny Van Houdt

We consider a two echelon supply chain. The retailer satisfies an AR(1) demand and replenishes according to an adaptive base-stock policy with MSE forecasting. Its order pattern depends on the forecasted demand during lead time. This lead time however is determined by the manufacturer's production system. It is well known that the manufacturing lead time itself depends on the variance of the retailer's order pattern. We develop an iterative procedure to solve this lead time dependency problem.

■ SD07

S-Sung I

Production and Supply Chain Systems

Cluster: Production Systems & Management

Invited Session

Chair: Yun Fong Lim, Assistant Professor, Singapore Management University, 50 Stamford Rd, Singapore, 178899, Singapore, yflim@smu.edu.sg

1 - The Revenue Driven Newsvendor under Information Asymmetries

Zhengping Wu, Asst. Professor, Singapore Management University, 50 Stamford Road, Singapore, 178899, Singapore, zpwu@smu.edu.sg, Wanshan Zhu

We consider the impact of advertisement revenue on the newsvendor's inventory decision. The newsvendor also has to appropriately decide how much to charge advertisers without knowing their marginal benefit from the advertisement. We discuss managerial insights obtained from our model.

2 - Chaos and Convergence on Bucket Brigade Assembly Lines

Yun Fong Lim, Assistant Professor, Singapore Management University, 50 Stamford Rd, Singapore, 178899, Singapore, yflim@smu.edu.sg, John Bartholdi, III, Donald Eisenstein

A bucket brigade assembly line is capable of complex new dynamics if workers walk back with finite velocities to get more work and are allowed to pass each other. In this extended model we found a new condition to make the line self-balancing. When the condition is violated the behavior of the line can be chaotic and so effectively indistinguishable from randomness, even though our model is completely deterministic.

3 - The Rolling Horizon Dynamic Plant Layout Problem

Jaydeep Balakrishnan, Assoc. Prof, Haskayne School of Business, University of Calgary, Calgary, AB, T2N 1N4, Canada, balakris@ucalgary.ca, Chun Hung Cheng

Traditionally dynamic plant layout problem (DPLP) research has assumed that the planning horizon is fixed. But many companies use rolling planning horizons. This paper compares the performance of algorithms under fixed and rolling horizons. The results show that algorithms that work well under fixed horizons may not work as well under rolling horizons. This might necessitate the use of a 'focus planning' approach.

■ SD08

S-Ching

Decision Analysis

Contributed Session

Chair: Teruhisa Nakai, Professor, Kansai University, 3-3-35, Yamate, Suita, 564-8680, Japan, nakai@iecs.kansai-u.ac.jp

1 - The Dual Serial Cost-sharing Rule

M. J. Albizuri, Professor, J. M. Zarzuelo, Basque Country University, Faculty of Economy and Business, Bilbao, Spain, elpalirm@bs.ehu.es, Jose M. Zarzuelo

In this paper we present a cost sharing rule for cost sharing problems. This rule is called the dual serial cost-sharing rule because it prescribes the same allocations as the serial cost-sharing rule in the dual problem. We provide two axiomatizations of this new rule, one by means of consistency, and a mechanism to implement this rule.

2 - Theoretical Aspects and Applications on Aggregative Rank

Fujun Hou, Beijing Institute of Technology, Beijing Institute of Technology, 5 South Zhongguancun Street, Beijing, Be, 100081, China, houfj@bit.edu.cn, Xin Zan, Qizong Wu

As starting inquiry into aggregative rank, three scheme sets are defined. Then, the aggregative rank is defined and the algorithm for obtaining the aggregative rank from an scheme set is proposed, the time complexity is analyzed as well. The aggregative rank index and the aggregative precedence relation between the schemes are established. The stability analysis of the aggregative rank is performed. Finally, an illustrative example is given.

3 - Improve Portfolio Efficiency: A Genetic Algorithm Approach

Xiaolou Yang, PhD, The University of Texas at Austin, 2501 Lake Austin Blvd. Apt.E201, Austin, TX, 78703, United States, xlyang98@hotmail.com

I present a decision-making process that incorporates genetic algorithms (GA) into a state dependent dynamic/stochastic portfolio optimization system. GA solve the model by forward-looking and backward-induction, which incorporates both historical information and future uncertainty when estimate the asset returns. It significantly improves the accuracy of expected return estimation and thus improves the overall portfolio efficiency over the traditional mean-variance model and Bayesian approach.

4 - Axial Cooperative Bargaining Solutions

Jose M. Zarzuelo, Basque Country University, elpzazaj@bs.ehu.es, Miguel Angel Hinojosa, A.M. Marmol

This paper introduces a new class of solutions to cooperative bargaining problems which are rationalized by piecewise linear increasing inequality averse social welfare functions defined on the agents' utility gains. Our main result is a complete characterization of Axial Bargaining Solutions in which an invariance property that we call Co-regional Invariance plays a central role. Generalized Gini solutions and inequality averse Choquet bargaining solutions are particular cases of this multi-valued new solution concept. Moreover, by relaxing the assumptions involved in the characterization of axial bargaining solutions, the class is enlarged considerably including Proportionality Averse Axial Bargaining Solutions which are also studied in the paper. Keywords: axiomatic bargaining theory, multi-valued bargaining solutions, generalized Gini bargaining solutions, inequality averse Choquet bargaining solutions.

5 - Selecting a Suitable Stable Equilibrium by Subjective Motive Distributions

Teruhisa Nakai, Professor, Kansai University, 3-3-35,
Yamate, Suita, 564-8680, Japan, nakai@iecs.kansai-u.ac.jp,
Shigehito Furuyama

We propose a method for selecting a suitable equilibrium from several stable equilibria obtained by a conflict analysis. Each player should calculate a probability of realization of each equilibrium by means of his subjective motive distributions and aim at the equilibrium having the maximum realization probability.

SD09

S-Ming I

Scheduling Systems and Applications (SS&A)

Cluster: Scheduling

Invited Session

Chair: Benjamin Yen, Associate Professor, The University of Hong Kong, School of Business, Pokfulam Road, Hong Kong,
benyen@business.hku.hk

1 - An Agent-based Web Service System for Optimization

Guohua Wan, Associate Professor, University of Macau, FBA,
Univ. of Macau, Taipa, Macau, China, ghwan@umac.mo

To solve optimization problems in the Internet environment, a web service system based on intelligent agent is proposed. First, a framework of a web service system for optimization problem solving through a market mechanism is developed. Second, the agent and the communications facilities are designed and implemented. The scheduling problems are used to test the feasibility of the framework and the design. Simulation results in lab environment are presented also.

2 - Rescheduling for Job Unavailability

Nicholas G. Hall, Fisher College of Business, Ohio State University,
2100 Neil Avenue, Columbus, OH, hall_33@cob.osu.edu,
Chris N. Potts

We consider problems where the processing of jobs has been planned, assuming they are all available initially. If the availability of some jobs is then delayed, the decision maker needs to adjust the existing schedule but without disrupting it excessively. For four classical scheduling objectives, we provide a computationally efficient optimal algorithm, an intractability proof which shows that this algorithm is the best possible, exact worst case analysis of a simple heuristic, and an FPTAS.

3 - Lift Scheduling: A Machine Learning Approach

Michael Chau, The University of Hong Kong, 7/F Meng Wah
Complex, Hong Kong, HK, Hong Kong, mchau@business.hku.hk,
Benjamin Yen

In this paper, we study the problem of lift (elevator) scheduling with the aim to optimize performance by ways such as minimizing the average wait time of passengers. A model is developed to represent the problem and a machine learning approach is proposed to address the problem.

SD10

S-Ming II

Approximation of Stochastic Programming: A Robust Optimization Perspective

Cluster: Mathematical Programming/Optimization

Joint Invited/Sponsored

Chair: Xin Chen, University of Illinois at Urbana-Champaign,
224 Mechanical Engineering Bldg, MC-244, 1206 West Green Street,
Urbana, IL, 61801, United States, xinchen@uiuc.edu

Co-Chair: Melvyn Sim, National University of Singapore, Singapore,
Singapore, dscsim@nus.edu.sg

1 - A Robust Perspective of Stochastic Programming

Xin Chen, University of Illinois at Urbana-Champaign,
224 Mechanical Engineering Bldg, MC-244, 1206 West Green
Street, Urbana, IL, 61801, United States, xinchen@uiuc.edu,
Peng Sun, Melvyn Sim

We introduce an approach for constructing uncertainty sets for robust optimization using new deviation measures of random variables known as the forward and backward deviations. We also propose a tractable robust optimization approach for obtaining approximate solutions to stochastic linear optimization problems with fixed recourse and chance constraints. Finally, we show an application of the framework for solving a project management problem with uncertain activity completion time.

2 - A Tractable Approximation of Stochastic Programming via Robust Optimization

Melvyn Sim, National University of Singapore, Singapore,
Singapore, dscsim@nus.edu.sg, Xin Chen, Peng Sun,
Jiawei Zhang

Stochastic optimization, despite its modeling capabilities, is well known to be computationally excruciating. We introduce a unified framework of approximating multiperiod stochastic optimization from the perspective of robust optimization. Specifically, we propose a framework that integrates multistage modeling with safeguarding constraints. Moreover, the framework is computationally friendly and scalable across periods. We report encouraging computational results.

3 - Goal Driven Optimization

Wenqing Chen, National University of Singapore, PHD by
research, Vice dean office, Business link 1, NUS, Singapore,
117592, Singapore, g0201946@nus.edu.sg, Melvyn Sim

We propose a goal driven stochastic optimization model that minimizes the risk of under performing against a targeted objective. Based on the popular CVaR measure, our proposed model is reduced to solving a small number of stochastic models. If the distribution is discrete and the number of scenarios is polynomial, our model is polynomially solvable. Under comprehensive parametric uncertainties, we also propose a decision rule based approximation by solving polynomial number of SOCP programs.

SD11

S-Boardroom

Workshop: Scenarios for the Future of OR/MS Practice (Continued)

Cluster: Practice/ORMS in Practice

Invited Session

Chair: Jay Horton, Managing Director, Strategis Partners, 8 Canisius
Close, Pymble, 2073, Australia, jay.horton@strategispartners.com.au

Co-Chair: Grace Lin, gracelin@us.ibm.com

1 - Scenarios for the Future of OR/MS Practice Workshop

Jay Horton, Managing Director, Strategis Partners, 8 Canisius
Close, Pymble, 2073, Australia,
jay.horton@strategispartners.com.au, Grace Lin

The objective for this session is to apply scenario planning to the future of ORMS Practice. Innovation in ORMS is an inherently uncertain process - and this is where scenario-based approaches play a valuable role. Jay Horton will serve as the workshop facilitator and will deliver an introductory paper for this session, entitled - "Exploring the Future of ORMS Practice using Scenario Planning - Operating Instructions". Its purpose would be to explain the process to be followed in this session in order to generate two or three scenarios before the close of the Session. The session will be an interactive workshop involving a diverse mix of 12-20 participants.

SD18

H-Crystal Room 2

Logistics Policy and Management

Contributed Session

Chair: Chun-Ying Chen, Department of Civil Engineering,
National Central University, No.300, Jhongda Rd., Jhongli, Taiwan,
93342013@cc.ncu.edu.tw

1 - Development of World Maritime Policy in the Era of Globalization

Jin Cheng, The HK Polyu, Department of Logistics, The Hong
Kong Polytechnic University, Hong Kong,
silascheng@china.com, Kevin K.X. Li

This paper examines the development of world maritime policy in the era of globalization. For accurate analysis and discussion, data and documents have been collected and examined for more than 50 major maritime nations. It shows that a huge gap exists between the USA and the other nations represented by Australia, Canada, China, and EC. It ascertains that the primary economic and political determinants, on which US maritime policy is based, will not change.

2 - Pricing Model for Airfreight Business

Michelle Cheong, Practice Assistant Professor, Singapore Management University, School of Information Systems, 80 Stamford Road, Singapore, 178902, Singapore, michcheong@smu.edu.sg, Rohit Bhatnagar, Stephen Graves

In airfreight, cargos are broadly categorized as dense or volumetric. For high-tech products, bulky packaging is used for protection during shipping. Thus, freighter planes tend to "volume out" before their weight limits are reached. Air freight companies can use price discount to increase the demand for dense cargo. We develop a pricing model to obtain an optimal mix of dense and volumetric cargos to maximize utilization and revenue. We illustrate our model with an example and provide insights.

3 - A Gate Assignment Model for Temporary Airport Closure

Chun-Ying Chen, Department of Civil Engineering, National Central University, No.300, Jhongda Rd., Jhongli, Taiwan, 93342013@cc.ncu.edu.tw, Shangyao Yan, Ching-Hui Tang

We develop a gate assignment model for temporary airport closure, where the objective is to minimize the number of changing gates subject to related operating constraints. The model is formulated as an integer network flow problem and is solved using a mathematical programming solver. To evaluate the model in practice, we perform a case study based on real operating data from the Chiang Kai-Shek Airport. The results show that the model could be useful for actual operations.

SD19

H-Crystal Room 3

E-commerce and Applications

Cluster: Information Systems and Electronic Commerce
Invited Session

Chair: Ting-Peng Liang, Professor, National Sun Yat-Sen University, Department of IM, National Sun Yat-Sen University, Kaohsiung, TW, Taiwan, tplieng@mail.nsysu.edu.tw

1 - How does Information Systems Investment have Business Value in Japan?

Junichi Iijima, Professor, Japan, j.ijima@m2.pbc.ne.jp

Based on Survey on Actual Condition of Information Processing by METI, Questionnaire on Organizational Characteristics by NRI and TIT, and Business Performance Indices published, we clarify how IS investment have bring in business value in enterprises in Japan. After comparing the results with several researches on the same subject in U.S., we state similarity and difference between U.S. and Japan.

2 - The Drivers of Wireless Technology Adoption in Business - A Fit-Viability Perspective

Shu-Chun Ho, Shu-Te University, National Sun Yat-Sen University, Department of Information Management, Kaohsiung, Taiwan, sch@mail.stu.edu.tw, Ting-Peng Liang, Cheng-Wei Huang

The dramatic development of wireless computing technology and the continued versatility of handheld devices are expected to not only considerably change the landscape of organizational computing but also pave the way for new business opportunities. Wireless computing technology embodied in portable mobile devices makes mobile commerce possible. However, the current adoption in enterprises does not match the high expectations from both practitioners and academics. This study proposes a Fit-Viability Framework (FVF) to investigate the drivers of business executives' decisions in adopting wireless technology. Fit, measures whether wireless technology fits for the tasks within the organization. Viability refers to the physical considerations of business executives in deciding whether to adopt a new technology. We conduct multiple case studies to verify our model and identify critical drivers of wireless technology adoption in business.

SD21

H-Jade Suite 2

Risk Analysis in Finance

Contributed Session

Chair: Keiichi Tanaka, Associate Professor, Tokyo Metropolitan University, 1-1 Minamiohsawa, Hachioji, Tokyo, 1920397, Japan, tanaka-keiichi@center.tmu.ac.jp

1 - Applying Augmented Lagrangian Method to Pricing American Option

Kai Zhang, PhD Candidate, The Hong Kong Polytechnic University, The Hong Kong Polytechnic University, Hong Kong, Hong Kong, zhang.kai@polyu.edu.hk, Kok Lay Teo, Xiaoqi Yang

In this paper, we apply ALM to pricing the American option. Convergence properties of ALM are considered. Numerical experiments show that ALM is more effective than penalty method, Lagrangian method, and comparable with PSOR method and is more robust in computation time under changes in market parameters.

2 - The Valuation of Callable Convertible Bonds with Reset Clauses of Conversion Price

Kyoko Yagi, Nanzan University, 27 Seirei, Seto, 489-0863, Japan, d04mm003@nanzan-u.ac.jp, Katsushige Sawaki

In this paper we present a valuation model of callable convertible bonds with reset clauses in a setting of optimal stopping problem between the holder and the issuer. The conversion price can be revised downward by the reset clause. We investigate how the reset clause affects the value of the convertible bond and the optimal conversion and call policies for the holder and the issuer, respectively.

3 - Dynamic Asset Allocation with Fixed-Income Securities

Jerome Detemple, Professor, Boston University School of Management, 595 Commonwealth ave., Boston, MA, 02215, United States, detemple@bu.edu, Marcel Rindisbacher

This paper develops a general framework for dynamic asset allocation with fixed-income securities. The optimal bond portfolio policy is derived and a novel decomposition of its intertemporal hedging part is established. The hedging demand has two components. The first is related to current factors determining the shape of the yield curve, the second captures future fluctuations in term structure shape factors.

4 - A Survey on Financial Leverage

Il-woon Kim, Professor, University of Akron, School of Accountancy, 259 South Broadway st., Akron, OH, 44325-4802, United States, ikim@uakron.edu, Sung-kyoo Huh

It is important to use reliable proxies based on theory or anchored by empirical evidence. This study is concerned with the quality of proxies used in the studies on the links between financial leverage and firm risk/value. We will review competing definitions of financial leverage and their elements, the use of industry average standards, and the utility of industry classification schemes. We will consider these in light of empirical evidence developed from a survey of Fortune 500 firms.

5 - Credit Derivatives with Recovery of Market Value for Multiple Firms

Keiichi Tanaka, Associate Professor, Tokyo Metropolitan University, 1-1 Minamiohsawa, Hachioji, Tokyo, 1920397, Japan, tanaka-keiichi@center.tmu.ac.jp, Masaaki Kijima

We show a pricing formula for a defaultable contract subject to recovery of market value (RMV) with heterogeneous multiple reference firms. The discounting short rate is adjusted by sum of the loss rate times the default intensity of each firm. Associated with the multiple defaultable firms with the RMV rule, a survival contingent forward measure can be constructed. As applications we study a vulnerable option on a defaultable bond and an option contract to enter into a CDS.

Monday, 8:00am - 9:30am

■ **MA01**

S-Tang II

Statistical Modeling for Quality Manufacturing

Cluster: Quality, Statistics and Reliability - Joint Invited/Sponsored

Chair: Ranjan Paul, Mathematical Modeler IV, The Boeing Co., P.O. Box 3707 MC 7L-21, Seattle, WA, 98124, United States, ranjan.k.paul@boeing.com

1 - Forecasting of Lead-Time Demands

I-Li Lu, Senior Statistician, The Boeing Company, P.O. Box 3707, MC 7L-22, Seattle, WA, 98124-2207, United States, i-li.lu@boeing.com

When variance of lead-time demand is estimated using assumption of independently distributed forecasts, it may result in significant loss of information therefore over(under) estimate the true variability of demand. In this paper, we develop variance formulae for lead-time demand and extend it to log transformed series using standard output from the SAS High Performance Forecasting system. We apply the formulae to time series data from commercial aviation industry and discuss the results.

2 - Batch-means Xbar Charts for Autocorrelated Data

Huifen Chen, Professor, Department of Industrial Engineering, Chung-Yuan Christian University, Chung-Li, Taiwan, huifen@cycu.edu.tw, Yuyen Cheng

We consider model-free designs of Xbar charts, where the quality characteristic follows a stationary time series process. Two design parameters need to be determined: the sample size and number of standard deviations away from the central line. We propose model-free methods for setting these design parameters so that the out-of-control ARL (average run length) is minimized while the in-control ARL equals a pre-specified value. Numerical comparisons are provided.

3 - Implementing the Quality Costs Model

Shuki Dror, Doctor/PhD, Ort Braude College, 51 Snunit St. POB. 78, Karmiel, Israel, 62 Six Days St., Byniamina 30500, Israel, Karmiel, 78, Israel, dror100_@netvision.net.il

In this work a method for Quality Costs implementation has been developed. The method combines the House of Quality Costs (HOQC), whose role is to translate the desired improvement in the Failure Costs into the relative importance of the Prevention Costs and the Appraisal Costs, with the CUSUM control chart to identify significant changes in the Quality Costs structure. The method was implemented in several companies and thus provides useful information on their vital Quality Costs components.

4 - Intelligent Manufacturing Based on RFID

Zhekun Li, Vice Dean, Kunming University of Science and Technology, XueFu Road 253, Kunming 650093, China, Kunming, 650093, China, zhekunli@public.km.yn.cn, Yujin Fan

This article mainly discusses intelligent manufacturing and RFID technology. It uses RFID in the intelligent manufacturing control and makes it become a kind of independent intelligent control. That makes the control simply, easily, timely and reliably. Intelligent Manufacturing Based on RFID is a good method for quality of product and personalized products and tailor-made solutions are taking over large shares of the marketplace from mass produced goods and standardized solutions respectively.

■ **MA02**

S-Tang I

Fuzzy Decision Making and Preference Structures

Cluster: Fuzzy Sets and Systems
Invited Session

Chair: Ta-Chung Chu, Professor, Department of Management and Information Technology, Southern Taiwan University of Technology, 1 Nan-Tai Street, Yung Kang City, 710, Taiwan, tcchu@mail.stut.edu.tw

1 - Optimum Process Mean Setting under the Membership Function

Chung-Ho Chen, Professor, Department of Management and Information, Southern Taiwan University of Technology, Taiwan, chench@mail.stut.edu.tw

In this paper, we present a modified Pulak and Al-Sultan's model for selecting the rectifying inspection plan and the optimum process mean under the fuzzy environment that satisfies the consumer's risk closely. We formulate the fuzzy mathematical programming model for this problem and derive the solution by adopting Chakraborty's method.

2 - Bilevel Decision with Generalized Semi-infinite Optimization for Fuzzy Mappings as Lower Level Problem

Yeong-Cheng Liou, Associate Professor, Department of Information Management, Cheng Shiu University, Taiwan, ycliou@csu.edu.tw, Yao Jen-Chih, Wu Soonyi

In this paper, we introduce the bilevel decision problems with parametric generalized semi-infinite optimization for fuzzy mappings as the lower-level problem, and its corresponding MPEC problems. For these problems, we establish two models which are different in the feasible region setting of lower-level problems. Some new existence results are obtained in rather weak conditions.

3 - Optimal Production Run Length and Maintenance Schedule in a Deteriorating Production System

Tzu-Hsien Lee, Associate Professor, Department of Management and Information Technology, Southern Taiwan University of Technology, Taiwan, thlee@mail.stut.edu.tw, Wen Chwan Chen

This paper considers manufacturing cost, inventory holding cost, system set up and maintenance costs, restoration cost and warranty cost to a deteriorating production system. This paper shows that there exists a unique optimal production run length and scheduled maintenance inspection number that minimize the expected total cost per item. The mathematical conditions to which the optimal production run length and scheduled maintenance policy during a production cycle are deduced.

4 - The Analysis and Comparison of Gauge Variance Estimators

Peng-Sen Wang, Assistant Professor, Department of Management and Information Technology, Southern Taiwan University of Technology, Taiwan, peng@mail.stut.edu.tw, Jeng-Jung Fang

The research improves the analysis of the measurement system. It modifies the method for calculating gauge variance. The comparison of gauge variance estimators for many methods based on the criterions of the biasness, variance, and mean squares error (MSE) of the estimators by a factorial arrangement of simulating measurement system shows that the modified estimator is better than the others.

■ **MA03**

S-Ballroom A

OMEGA RHO Featured Session

Sponsor: Location Analysis

Sponsored Session

Chair: Yupo Chan, Department of Systems Engineering, University of Arkansas at Little Rock, 2801 South University, Little Rock, AR, 72204-1099, yxchan@ualr.edu

Omega Rho is a society of collegiate chapters and members for promoting and recognizing superior scholarship and leadership. Membership is prestigious with only approximately 5,100 student and faculty inductees qualified at 37 chapters. The objectives of the Omega Rho International Honor Society are to encourage the study of Operations Research and Management Science related disciplines and to recognize academic excellence and leadership potential in these areas.

1 - Cyber Infrastructure: Initiatives at the US National Science Foundation

Stephen G. Nash, Division of Design & Manufacturing Innovation, National Science Foundation, 4201 Wilson Blvd., Room 512, Arlington, VA, 22230, snash@nsf.gov

The US National Science Foundation has established an Office of Cyber infrastructure to coordinate and support the acquisition, development and provision of state-of-the-art cyber infrastructure resources, tools and services essential to the conduct of 21st century science and engineering research and education. The speaker will outline the activities of this office, and their relevance to Cyber Transportation Logistics research. This featured session is an introduction to three other sessions on the same topic. Stephen Nash is the Program Director for the Operations Research program at the U.S. National Science Foundation, on leave from George Mason University. He received a PhD. in computer science in 1982 from Stanford University. He has been a member of the editorial boards of Operations Research, and several other journals.

■ MA04

S-Ballroom B

Hierarchical Decision and Simulation System for the Extended Enterprise

Cluster: Production Systems & Management
Invited Session

Chair: Young Jun Son, Assistant Professor, The University of Arizona, Systems and Industrial Engineering Dept., Tucson, AZ, 85721, United States, son@sie.arizona.edu

1 - Artificial Manufacturing Systems: From Simulations to Experiments and Parallel Executions

Fei-yue Wang, Professor, The University of Arizona, Systems and Industrial Engineering, Tucson, AZ, 85721, United States, feiyue@gmail.com

This paper outlines a new method for operational studies and implementation of manufacturing systems: artificial manufacturing systems for computational experiments and parallel execution. The idea is to construct artificial models for alternative manufacturing operations for training, experimenting, structural improvement, and real-time optimization. To this end, artificial manufacturing systems will run in parallel with actual manufacturing systems in both on-line and off-line fashions.

2 - Solving Semi-Open Queuing Network Part I: Single Class Networks

Sunderesh Heragu, Mary Lee and George Duthie Chair in Engineering Logistics, University of Louisville, Department of Industrial Engineering, Louisville, KY, 40292, United States, s.heragu@louisville.edu, Jing Jia

In this paper we examine queuing systems consisting of two parts: an external queue and an inner network where the population capacity is constrained. We study such systems with single class customers in tandem configuration. Our approximation method combines the use of the matrix-geometric method and the decomposition-aggregation approach. Numerical results show the accuracy is very good compared to simulation.

3 - Federation of Multi-resolution Hybrid Models for Hierarchical Supply Chain Planning

Young Jun Son, Assistant Professor, The University of Arizona, Systems and Industrial Engineering Dept., Tucson, AZ, 85721, United States, son@sie.arizona.edu, Jayendran Venkateswaran, Ronald G. Askin

In this paper, we present an innovative methodology that allows a multi-scale federation of interwoven hybrid simulations (system dynamic and discrete event) and decision models to carry out an integrated analysis of stability and performance across a supply chain network. Plans generated according to the proposed approach are more robust against future disturbances and more feasible for implementation than those generated using conventional methods.

■ MA05

S-Ballroom C

Non-cooperative Supply Chain Models

Cluster: Supply Chain Models
Invited Session

Chair: Gurhan Kok, Assistant Professor, Fuqua School of Business, Duke University, One Towerview Drive, Durham, NC, 27708, United States, gurhan.kok@duke.edu

1 - Quantity Discounts Under Demand Uncertainty

Feryal Erhun, Assistant Professor, Stanford University, MS&E, Stanford, CA, 94305, United States, ferhun@stanford.edu, Nihat Altintas, Sridhar Tayur

We study single item, all-unit quantity discounts under stochastic demand in a single supplier single buyer setting. For a single period the buyer's optimal policy is a three-index policy. Higher index policies with complex order structures may turn out to be optimal for the infinite horizon problem. We suggest discount schemes the supplier may use to moderate the buyer's ordering behavior to achieve specific operational objectives. We also discuss potential limitations of such discount schemes.

2 - Consumer Behavior in Inventory Management

Rodney Parker, Assistant Professor, Yale School of Management, P.O. Box 208200, New Haven, CT, 06520-8200, United States, rodney.parker@yale.edu, Tava Olsen

We consider the effect of inventory stockouts upon customers' dissatisfaction leading to their departure from the market. For a single firm we find the optimal inventory with consumer forgiveness, stochastic market shocks, advertising, and

consumer incentives. The model is then extended to duopolists who seek to draw disaffected customers from the other firm's markets. Interpretations of the values of committed and affiliated customers can be found in the analysis.

3 - Process Innovation in Supply Networks

Gurhan Kok, Assistant Professor, Fuqua School of Business, Duke University, One Towerview Drive, Durham, NC, 27708, United States, gurhan.kok@duke.edu, Fernando Bernstein

We consider general decentralized assembly networks, in which suppliers invest in process innovation and cost reduction, while the buyer may partly subsidize those activities. We investigate how the investment levels depend on the structure of the supply network. We characterize the open-loop equilibrium of the investment game. We also explore the impact of knowledge sharing among suppliers on their investments in process innovation and on their ability to reduce costs.

■ MA06

S-Sung I

Scheduling/Re-scheduling

Cluster: Operations Management
Invited Session

Chair: Melih Özlen, Research Assistant, Middle East Technical University, Metu, Dept. of Industrial Eng, Ankara, 06531, Turkey, melih@ie.metu.edu.tr

1 - Parallel Machine Rescheduling Algorithm for Minimizing a Function of Flowtime and Reassignment Cost

Melih Özlen, Research Assistant, Middle East Technical University, Metu, Dept. of Industrial Eng, Ankara, 06531, Turkey, melih@ie.metu.edu.tr, Meral Azizoglu

In this study we consider a parallel unrelated machine problem with two criteria: total flowtime and total job reassignment cost. We assume a monotone increasing function of two criteria and develop an optimization algorithm. We test the efficiency of the algorithm on randomly generated test problems.

2 - Bounding Approaches for a Discrete Time and Tool Magazine Capacity Allocation Problem in FMS

Selin Bilgin, Research Assistant, Middle East Technical University, Metu, Dept. of Industrial Eng, Ankara, 06531, Turkey, selin@ie.metu.edu.tr, Meral Azizoglu

This study addresses a capacity allocation problem that arises in semi-conductor industries and flexible manufacturing systems. We assume parallel CNC machines having limited time and tool magazine capacities and limited number of available tools. We propose several lower and upper bounding procedures on the maximum weight of selected part types.

3 - A Logic-Based Optimization Approach for Integrated Planning and Scheduling

Metin Turkay, Asst. Professor, Koc University, Center for Comp. Biology & Bioinformatics, College of Engineering, Sariyer, IS, 34450, Turkey, mturkay@ku.edu.tr

Advanced planning and scheduling integrates planning activities with detailed implementation schedules. The discrete nature of these systems is represented using disjunctions and the interdependencies among discrete decisions are expressed using propositional logic. The use of propositional logic improves the relaxation gap and allow fixing additional binary variables at each node of the branch and bound tree. The approach illustrated on challenging advanced planning and scheduling problems.

■ MA08

S-Ching

Decision Analysis Involving Health and the Environment

Sponsor: Decision Analysis
Sponsored Session

Chair: L. Robin Keller, Professor, University of California, Irvine, Irvine, CA, 92697-3125, United States, LRKeller@uci.edu

1 - Decision Analysis and Portfolio Management Practice in the Pharmaceutical Industry

Kazuo Ezawa, Senior Director, Business Analysis, Daiichi Medical Research, One Maynard Dr, Park Ridge, NJ, 07656, United States, KazuoEzawa@DMR.DaiichiUS.com

Decision Analysis and Portfolio Management has significantly contributed for the success of the pharmaceutical companies, and it is practiced in very different ways in these companies. We discuss current practices in the pharmaceutical industry and challenges facing the decision analysis and portfolio management in the pharmaceutical industry.

2 - Prostate Cancer Decision Analyst: Choosing the Best Treatment

Jay Simon, UC Irvine, 8801 Palo Verde Rd, Irvine, CA, 92617, United States, jsimon05@merage.uci.edu

A man diagnosed with prostate cancer faces a difficult decision. Treatments have varying cure rates and a wide range of side effects. The decision has multiple objectives, and the relevant information must be customized for each person in order to provide value. We will introduce and describe a quantitative process by which an individual prostate cancer patient can meaningfully compare treatments.

3 - A Multiple-objective, Multiple-stakeholder Decision Analysis Approach for Water Resources Planning

Tianjun Feng, University of California, Irvine, The Paul Merage School of Business, Irvine, CA, 92697-3125, United States, tfeng02@merage.uci.edu, L. Robin Keller, Craig Kirkwood, Nancy Jones, Jay Simon, Lowell Kessel

We conducted a web-based survey of water resources stakeholders to structure a multiple objective decision model for water resource policy in Central Arizona, USA. The model informs stakeholder communications and research activities; highlights special interests of important stakeholders; and helps focus discussion and promote constructive interaction for water policy planning.

MA09

S-Ming I

New Scheduling Models and Applications

Cluster: Scheduling
Invited Session

Chair: Xiangtong Qi., Department of Industrial Engineering and Logistics Management, Hong Kong University of Science and Technology, Clear Water Bay, Kowloon, Hong Kong, ieemqi@ust.hk

1 - Preemptive Scheduling Policy for Multiple Loan Repayment

Qing Ding, Assistant Professor of Operations Management, Lee Kong Chian School of Business, Singapore Management University, dingqing@smu.edu.sg, Tai Chiu Edwin Cheng, Chi To Ng

This paper considers a financial management problem of repaying multiple loans. We model the multi-loan-repayment problem as a makespan problem with preemptive and time dependent processing times. We transform the scheduling model into a continuous optimization problem. The solution is approximately determined by a group of linear equations. We introduce efficient heuristics and identify the solvable cases for the scheduling model to reveal the managerial insights and illustrate the computational complexity. Our model and results can be applied to the general practical situation with the variable cash flow and interest rate, the exponential (compound or continuous compound) interest rates, and the stochastic environment. Theoretically, as far as we know, it is the first paper to study the preemptive scheduling policy for the time-dependent scheduling problems, though the non-preemptive time dependent scheduling problem have received increasing attention in recent years.

2 - A Multiple-Exercise Option Contract Model for Water Resource Scheduling

Huimin Wang, State Key Laboratory of Hydrology Water Resource and Hydraulic Engineering, Business School of Hohai University, China, HMwang@mailsvr.hhu.edu.cn, Guoguang Liu

After the engineering project of South-to-North Water Transfer has been completed, an efficient scheduling and allocation of water resource becomes a crucial issue for economic analysis. A Multiple-exercise option contract model for South-to-North Water Transfers consist of three parts: (i) a stochastic river flow model, which simulates the probabilities and characteristics of flood occurrences; (ii) a hydrologic allocation model, which simulates river and ditch capacity and flows, storage reservoir(lake) operation, evaporation, municipal water demand; and (iii) an option valuation model, which calculates the difference between the cost of alternative supplies and the expected cost of exercising the option. After comparing several types of computational valuation approaches, we give our approach of option valuation of South-to-North Water Transfer. A Monte Carlo simulation and sensitivity testing are used to test the changing effects when varying some of the parameters.

3 - Scheduling Preemptive Multiprocessor Tasks to Minimize Total Weighted Completion Time on Two Dedicated Processors

Ceyda Oguz, Department of Industrial Engineering, Koc University, Rumeli Feneri Yolu, Sariyer 34450, Istanbul, Turkey, coguz@ku.edu.tr, Xiangtong Qi

We consider scheduling preemptive multiprocessor tasks on two dedicated processors to minimize total weighted completion time. We first show that this problem is NP-hard in the strong sense. We then present properties of the optimal schedule. Based on these properties, we propose a heuristic algorithm and analyze its average performance by a computational experiment. The results suggest that the heuristic algorithm is both efficient and effective with a relative error less than 2%.

4 - Parallel Batch Scheduling: A Survey

Zhang Yuzhong, Qufu Normal University, Rizhao, Shandong, China, yuzhongrz@163.com

In this paper, we present an overall survey on batch scheduling in three aspects: the off-line model, the on-line model and the model with non-identical job sizes. We propose many open problems and brand new sub-fields deserving further research. Abundant references are provided as well aiming to take the interested readers rapidly to the research frontier. Moreover, we point out for the first time that in the sense of a new way of encoding, parallel batch scheduling with infinite machine capacity and arbitrary release times to minimize total completion time is NP-hard.

MA10

S-Ming II

Simplicial Methods and Applications

Cluster: Mathematical Programming/Optimization
Joint Invited/Sponsored

Chair: Chuangyin Dang, Associate Professor, City University of Hong Kong, 83 Tat Chee Avenue, Kowloon, HK, Hong Kong, mecdang@cityu.edu.hk

1 - A Fixed Point Theorem for Discontinuous Functions

P. Jean-Jacques Herings, Professor, University of Maastricht, P.Herings@ALGEC.unimaas.nl

Let P be a non-empty bounded polyhedron and f a mapping from P to P satisfying that for every x of P for which f maps x to a point different from x there exists a neighborhood of x in P such that for any y and z in this neighborhood it holds that the inner product of the difference between y and the image of y under f and the difference between z and the image of z under f is nonnegative. Then f has a fixed point. This existence condition allows for discontinuities and irregularities.

2 - An Adjustment Process for Nonconvex Production Economies

Hans Kremers, Professor, German Institute for Economic Research, jkremers@diw.de

We prove the existence of a path of market conditions that links any arbitrarily chosen market condition with an equilibrium, in a general equilibrium model with possibly nonconvex production technologies. This existence theorem holds for any semi-algebraic version of the model. Any such path can be approximated arbitrarily close by applying a simplicial algorithm. By restarting this algorithm in a different market condition, we may find more than one equilibrium.

3 - A Simple and Superior Triangulation of the Euclidean Space for Simplicial Methods

Chuangyin Dang, Associate Professor, City University of Hong Kong, 83 Tat Chee Avenue, Kowloon, Hong Kong, mecdang@cityu.edu.hk

Efficiency of simplicial algorithms depends critically on their underlying triangulations. Based on the D1-triangulation and a decomposition, a simple and superior triangulation of the Euclidean space is developed for simplicial algorithms, which is called D1(m) triangulation. The number of simplices of the D1(m)-triangulation in an n-dimensional unit cube is significantly smaller than that of any existing triangulation of the Euclidean space adopted in simplicial algorithms.

MA11

S-Boardroom

Models for Electricity Market Behaviour

Sponsor: Energy, Natural Resources and the Environment
Sponsored Session

Chair: Edward Anderson, Australian Graduate School of Management, University of New South Wales, Sydney, NSW 2052, Australia, eddiea@agsm.edu.au

1 - Architecture Options for Power Markets

Kumar David, eeakdavi@polyu.edu.hk

In electricity markets the term Architecture refers to both system operations and market-side options such as auctions, price formation, congestion management and retail options. Mathematical programming and broader OR methods are used in both activities. Centralised Pools, and decentralised Power Exchanges and bilateral deals, are the two basic architectural approaches; real systems are a blend. The paper describes how OR methods facilitate both system operations and market activities.

2 - Equilibrium Experiments Over the NZEM

Golbon Zakeri, Dr., University of Auckland, Dept. of Engineering Science, Auckland, New Zealand, g.zakeri@auckland.ac.nz

We will describe equilibrium experiments over the New Zealand electricity market and discuss the results.

3 - Supply Function Equilibria with Asymmetric Firms

Edward Anderson, Australian Graduate School of Management, University of New South Wales, Sydney, NSW 2052, Australia, eddiea@agsm.edu.au, Xinmin Hu

Supply functions (involving both prices and quantities) are the best way to model firm behaviour in wholesale electricity markets. We study supply function equilibria when firms differ in both costs and capacities. We characterize the equilibria and we propose a new numerical method to find such equilibria, using a discretization of the demand distribution. This approach has good theoretical convergence behavior and we present numerical results to show that it works well in practice.

4 - Analysing Interactions between the Contract Market and the Spot Electricity Market

Xinmin Hu, Australian Graduate School of Management, University of New South Wales, Sydney, NSW 2052, Australia, X.Hu@unsw.edu.au, Edward Anderson

A computational bilevel game theory model of analysing the interactions between contracts and spot biddings in electricity markets are presented. The work extends existing models by allowing general forms of supply functions and generation capacity constraints in the lower level (spot market) game. Numerical results and comparisons with those using linear supply functions without capacity limits are discussed.

MA12

S-Celestial Court-Jade

Models of Flexible Manufacturing Systems

Contributed Session

Chair: Soo Tae Kwon, Professor, Jeonju University, 1200, 3GA Hyoja-Dong, Wansan-Gu, Jeonju, 560-759, South Korea, kstfms@jj.ac.kr

1 - Introducing Dispersed Network Manufacturing as a Business Model

Hamid Noori, Professor, Wilfrid Laurier University, 75 University Av, Waterloo, ON, N2L 3C5, Canada, hnoori@wlu.ca, WB Lee

We will explain how SMEs can form an adaptive network to create competitive advantages on both the collaborative and individual scales. The participating SMEs members focus on their specialized tasks and share their production resources to create a loosely structured and flexible enterprise. Because of the network's requirement to re-form itself to the needs of each unique incoming project, the members have the ability to rapidly develop and enhance their internal production capabilities.

MA13

S-Celestial Court-Pearl

Inventory Decisions in Supply Chains

Contributed Session

Chair: Yuanjie He, Assistant Professor, California State Polytechnic University, 3801 West Temple Avenue, Pomona, CA, 91768, United States, he@csupomona.edu

1 - Optimal Inventory Policies and Value of Inventory Information in a Two-Echelon Supply Chain

Xiuhui Li, PhD, NTU, NBS, S3-01B-73, Nanyang Avenue, Singapore, 639798, Singapore, xiuhui@pmail.ntu.edu.sg, Qinan Wang

We consider a supply chain that consists of a supplier and a single buyer. Demand at the buyer follows a Poisson process. We develop the optimal inventory replenishment policy for the supplier when on-line information on the buyer's inventory status is available, and show that such a policy always exists. We refer to this policy as a continuous-review reorder (R,s,Q) policy. This analysis provides an exact evaluation of the value of on-line information for the system.

2 - Joint Pricing and Inventory/Production (EOQ) Decisions Across Products in a Supply Chain

Runhong (Annie) Niu, PhD student, University of Alberta, School of Business, Edmonton, AB, T6G 2R6, Canada, rniu@ualberta.ca, Ignacio Castillo, Xuan Zhao

We consider joint pricing and inventory/production (EOQ) decision problems with substitutable products for each member in a two-stage supply chain. Demand for each product is deterministic but sensitive to the retail prices of all products. We analyze each member's pricing and EOQ problems and found that

equilibrium exists under certain conditions. The problem is also considered under VMI. We provide numerical examples that develop insights for product line and category management.

3 - Inventory Policies for a Single-Supplier Multi-Retailer Supply Chain

Su-Hwa Wu, National Dong Hwa University, 1, Sec 2, University Road, Hualien, 974, Taiwan, marina@mail.ndhu.edu.tw, Juhwen Hwang

We investigate inventory policies for a supplier with multiple retailers in a two-echelon supply chain. Given that the retailers implement EOQ policy, the orders released by any retailer form a sequence of demand stream for the supplier. To deal with the property of the demand stream, this research develops an appropriate inventory policy to minimize the supplier's total cost. Numerical examples are presented to reveal the sensitivity of cost parameters.

4 - Inventory Control Policy with Fixed Incentives

Yuanjie He, Assistant Professor, California State Polytechnic University, 3801 West Temple Avenue, Pomona, CA, 91768, United States, he@csupomona.edu, Abolhassan Halati

We study the inventory control problem when the firm is offered a fixed amount incentive (rebate, free shipping, etc.) to affect the order quantity. A state dependent (s,S) policy is shown to be optimal. We also show how the supplier can use this promotion to centralize the supply chain.

MA14

S-Celestial Court-Coral

Management of Healthcare Delivery Processes

Cluster: Medical Applications

Invited Session

Chair: Vedat Verter, Professor, McGill University, 1001 Sherbrooke St. W., Montreal, QC, H3A 1G5, Canada, vedat.verter@mcgill.ca

1 - Improving Patient Flow in Hospitals: Strategies to Overcome Measurement and Implementation Barriers

Brent Asplin, Department Head, Emergency Medicine, Regions Hospital and HealthPartners Research Foundation, 640 Jackson Street, St. Paul, MN, 55101, United States, Brent.R.Asplin@HealthPartners.Com, Thom Flottesmesch, Brad Gordon

Operations management principles hold great promise for improving the efficiency of patient flow; however, these principles have not been widely adopted by hospitals. We describe common measurement and implementation barriers for patient flow initiatives, recommend strategies for mitigating these barriers, and call for the widespread adoption of operations management principles to improve patient flow in hospitals.

2 - Health Effects of Restricted Hospital Utilization during Toronto's SARS Outbreak: Lessons Learned

Michael Schull, Dr., Institute for Clinical Evaluative Sciences, 2075 Bayview Avenue, Toronto, ON, M4N 3M5, Canada, mjs@ices.on.ca, Brian Schwartz, Therese Stukel, Marian Vermeulen, David Alter, Merrick Zwarenstein, Doug Manuel, Astrid Guttman, Andreas Laupacis

Restrictions on non-urgent hospital utilization were imposed to control Toronto's Severe Acute Respiratory Syndrome (SARS) outbreak in 2003. We describe their impact on hospital utilization, and whether there were spill-over effects on urgent hospital and other health care services. We derive population-based rates of hospital admissions and emergency department visits (by urgency), and outpatient services in Toronto and unaffected comparator regions, before, during and after the SARS outbreak.

3 - A Design for a Health Care System Simulator

Andrew Seila, Professor, The University of Georgia, 303 Brooks Hall, Terry College of Business, Athens, GA, 30602-6273, United States, andy@ms.terry.uga.edu

Models for health care delivery system are similar to models for manufacturing, transportation and other systems, but they differ in important respects. As a result, general-purpose simulation tools are inadequate, or at least suboptimal, for modeling health care systems. This paper proposes a set of design criteria for health care simulation tools, examines the shortcomings of existing simulation tools and presents a design for a modeling and simulation tool for health care delivery systems.

4 - A Network Flow Model for Hospital Mergers

Evrin Didem Gunes, Assistant Professor, Koc University, Rumeli Feneri Yolu, Istanbul, 34450, Turkey, egunes@ku.edu.tr, Hande Yaman

This work is motivated from consolidation of different hospital networks in Turkey, focusing on implications on the resource allocations and the flow of patients in the health system. A network flow model for the flow of patients in a health system consisting of several providers is presented to find the best re-allocation of resources between the hospitals and the best patient-hospital match, with the objective of minimizing the cost of resource transfer and cost of patient flow.

MA15

S-Celestial Court-Amber

Recent Development in Technology Management

Contributed Session

Chair: Vincent Cho, Assistant Professor, Department of Management and Marketing, The Hong Kong Polytechnic University, Hung Hom, Hong Kong, msvcho@polyu.edu.hk

1 - Current Trends in Approaches to Strategic Management of ICTs

Mehdi Asgarkhani, Principal Lecturer/Associate Professor, CPIT, New Zealand, P.O. Box 540, Christchurch, 8015, New Zealand, asgarkhanim@cpit.ac.nz

The paper/discussion elaborates on current trends in strategic management of ICTs. It will be presented in two parts. Part 1 reviews the most widely recommended strategic thrusts and planning frameworks. Part 2 outlines the results of the study of a focus group of organizations and compares and contrasts real practices with that of proposed frameworks by theoreticians (discussed in Part 1).

2 - New Frontiers for Scholarly Research on Management of Technology

Michael K. Badawy, Professor, Virginia Tech, P.O. Box 2931, Merrifield, VA, 22116, United States, mbadawy@vt.edu

This presentation will provide a snap shot of the current status of research in the interdisciplinary field of management of technology, describe the major research streams, identify some of the gaps in the literature, and propose some approaches and strategies for bridging these gaps, and advancing scholarship in this field.

3 - Technological Capabilities, Networks and Clusters:**Determining Performance of IT Firms in India**

Pankaj Chandra, Professor, IIM Ahmedabad, Vastrapur, Ahmedabad, Gu, 380015, India, chandra@iimahd.ernet.in, Rakesh Basant, Rajesh Upadhyayalu

We present findings from an empirical study to establish the determinants of performance of Indian IT (software & hardware) firms. The paper explains how firms build technological capabilities through effective linkages. We also present results from an econometric modeling to explain differential performance between firms located within and outside clusters.

4 - Study on Actual Usage in the Post-acceptance Stage

Vincent Cho, Assistant Professor, Department of Management and Marketing, The Hong Kong Polytechnic University, Hung Hom, Hong Kong, msvcho@polyu.edu.hk, Hunphry Hung

Past studies usually predict usage in pre-acceptance stage. However, a few studies attempt to predict usage in the post-acceptance stage. Bhattacharjee (2001) studied continuance intention by including factors such as satisfaction. Our study base on Bhattacharjee and investigate the relationships among intention, usage, satisfaction and performance impact. Our model confirms that post-acceptance experience is significantly affecting continued usage.

MA16

S-Celestial Court-Amethyst

Recent Advances in Bioinformatics

Contributed Session

Chair: Shuang Liu, Graduate Researcher, Dept. of Mathematics, University of California, One Shields AVE., Davis, CA, 95616, United States, shnliu@ucdavis.edu

1 - Complexes of Conjugated Copolymers and DNA: Platforms for Multicolor Biosensors

Guang-cun Shan, Dr., PI, Laboratory of Advanced Materials, Fudan University, Handan Road, Shanghai, Shanghai, 200433, China, arestian@163.com, B. Liu

With the aid of PNA-C* probe strands, we have obtained three colors, depending on the solution content, when the complementary ssDNA is found. Fine-tuning of these electrostatic and optical events could lead to multicolor biosensor schemes that take advantage of the fluorescence amplification characteristic of

conjugated polymers. Our results provide design guidelines for water-soluble conjugated polymer structures that change emission color as a result of conformational changes.

2 - Deriving Domain-domain Interactions from Protein-protein Interactions Networks

Ka-Lok Ng, Associate Professor, Dept. of Biotechnology and Bioinformatics, Asia University, 500 Lioufeng Road, Wufeng Shiang,, Taichung, TW, 413, Taiwan, klng@asia.edu.tw, Jeffrey J.F. Tsai, Chien-Hung Huang

The domain combination pair approach [Han et al. 2004] is employed to derive putative protein domain-domain interactions (DDI) from the protein-protein interaction database. The results of putative DDI by Han et al. are extended to seven species. The predicted domain-domain interaction results are compared with that of the database InterDom. All the predicted results are available at http://210.70.80.163/kzbio2/r_ap.php. Reference: Dong-Soo Han et al. 2004. Nucl. Acids Res. 32, 6312.

3 - Identifying DNA Consensus Sequence Without Shared Patterns Using Linear Programs

Han-Lin Li, Chair Professor, National Chiao Tung University, 1001 Ta-Hsueh Rd, Hsinchu, 300, Taiwan, hlli@cc.nctu.edu.tw, Chang-Jui Fu

The determination of the regulatory binding sites is critical to functional analysis of gene expression. Current methods can find such a consensus sequence but require a training set or a previously known pattern format. This study proposes a linear programming approach to find consensus sequence globally. The proposed method has advantages over current methods including: 1) no prerequisite shared pattern needed; 2) global optimum is promised; 3) logical constraints are conveniently applicable.

4 - Clustering of Gene Expression Data

Shuang Liu, Graduate Researcher, Dept. of Mathematics, University of California, One Shields AVE., Davis, CA, 95616, United States, shnliu@ucdavis.edu, David Rocke

Model-based clustering algorithms provide a way to cluster the data using information revealed by the data itself without prior knowledge. We investigate the application of robust estimation in initial cluster construction and principal component analysis as a data transformation when clustering genes and samples. The combination of these techniques could improve the accuracy and efficiency of model-based clustering in dealing with high volume and high dimensional gene data.

MA17

H-Crystal Room 1

Capacity Planning

Cluster: Capacity Planning

Invited Session

Chair: J. MacGregor Smith, Professor, University of Massachusetts, Dept. of Mech. and Indus. Engin., Amherst, MA, 01003, United States, jmsmith@ecs.umass.edu

Co-Chair: Renato de Matta, Associate Professor, University of Iowa, 108 PBB, Iowa City, IA, 52242, United States, renato-dematta@uiowa.edu

1 - The Capacity Acquisition and Disposal Problem with Age-Dependent Deterioration

Renato de Matta, Associate Professor, University of Iowa, 108 PBB, Iowa City, IA, 52242, United States, renato-dematta@uiowa.edu, Vernon Hsu

We present a multi-period deterministic capacity planning problem where the rate of capacity deterioration depends on the time the capacity is acquired. Our problem considers demand fluctuation, operating and maintenance costs that depend on the amount of capacity utilized, capacity disposal, and capacity shortage. Formulated as a mixed integer programming model, we exploit the problem structure to develop efficient solution methods. Computational results are presented.

2 - On Traffic Assignment in State-dependent M/G/c/c Queueing Networks

Tom van Woensel, TU Eindhoven, P.O. Box 513, Pav F5, Eindhoven, NL-5600 MB, Netherlands, t.v.woensel@tm.tue.nl, J. MacGregor Smith, Frederico Cruz

We briefly review some of the formulas that have been developed over the years to achieve a simple and direct way to estimate travel times, including deterministic and stochastic ones, based on which we propose algorithms to find optimal traffic assignments in networks subjected to congestion. Computational results show that the approach is quite efficient.

3 - Multi-server, Finite Waiting Room, M/G/c/K Optimization Models

J. MacGregor Smith, Professor, University of Massachusetts, Dept. of Mech. and Indus. Engin., Amherst, MA, 01003, United States, jmsmith@ecs.umass.edu

Optimization models for multi-server queueing systems are very appropriate capacity planning and design tools for manufacturing, telecommunication, transportation, and facility modelling applications. A design methodology based upon a two-moment approximation algorithm is utilized for optimizing the number of servers and the amount of waiting room in these M/G/c/K systems. Extensive computational results are provided to evaluate the efficacy and usefulness of this optimization methodology.

MA18

H-Crystal Room 2

Supply Chain Logistics: Contracts and Incentives

Cluster: Shipping, Transport and Supply Chain Logistics
Invited Session

Chair: Xianghua Gan, Assistant Professor, The Hong Kong Polytechnic University, The Department of Logistics, Hong Kong, China, Lgtxgan@polyu.edu.hk

1 - Channel Coordination in Fashion Supply Chains with Members Having Mean-Variance Objectives

T.M. Jason Choi, The Hong Kong Polytechnic University, Institute of Textiles & Clothing, Hong Kong, China, tcjason@polyu.edu.hk

This paper investigates the coordination challenge in a fashion supply-chain with decision makers taking mean-variance objectives. Through the studies of a wholesale-pricing-policy, we find that the incorporation of risk concerns into the setting of a supply-chain coordinating policy is important because it can substantially affect the achievability of channel coordination.

2 - Contracting under Asymmetric Production Cost Information

Xianghua Gan, Assistant Professor, The Hong Kong Polytechnic University, The Department of Logistics, Hong Kong, HK, China, Lgtxgan@polyu.edu.hk, Metin Cakanyildirim, Suresh Sethi

We study a supply chain consisting of a supplier and a retailer who faces a newsvendor problem. The supplier knows better information on his production cost than the retailer does. The retailer orders a menu of contracts, then the supplier either chooses one from the menu of contracts or rejects all of them. We derive an optimal contract menu for the retailer under a general assumption, and we find that in some cases the supply chain can be coordinated even with asymmetric information.

MA19

H-Crystal Room 3

Customer Relationship Management and Business Strategy

Cluster: Information Systems and Electronic Commerce
Invited Session

Chair: Ming-Hui Huang, Professor, National Taiwan University, 1, Sec. 4, Roosevelt Road, Taipei, 10617, Taiwan, huangmh@ntu.edu.tw

1 - Customer Relationship Management as a Quality Differentiation Strategy

Pei-Hsiang Tsai, National Taiwan University, 1, Sec. 4, Roosevelt Rd., Taipei, Taiwan, r93044@im.ntu.edu.tw, Ming-Hui Huang

Given the limitation of technology capability, it is difficult to maintain a quality advantage over competitors. This study empirically examines two innovative usages of customer relationship management for quality differentiation: Customers co-produce quality to enhance true quality or substitute relationship for quality to enhance perceived quality. Strategic implications are discussed.

2 - Building Knowledge and Relationship Capabilities from Customer Relationship Management

Jack Wang, r93009@im.ntu.edu.tw, Ming-Hui Huang

CRM builds firm capabilities analytically and operationally. Analytical CRM establishes knowledge capability that offers a deeper understanding of customer preferences, whereas operational CRM improves relationship capability that is more sustainable than relationship marketing. This study presents results regarding the choice of CRM for the two capabilities and the subsequent performance.

3 - A New Look at Loss Aversion in Disconfirmation: The Role of Customer Services

Chung-Shun Liao, National Taiwan University, 1, Sec. 4, Roosevelt Rd., Taipei, Taiwan, r93048@im.ntu.edu.tw, Ming-Hui Huang

Disconfirmation paradigm maintains that the gap between expectation and performance determines satisfaction. This study examines the role of customer services in filling the gap. Based on two concepts of prospect theory, reference dependence and loss aversion, this compensation effect of customer services is more apparent for high-end than low-end products.

4 - Low Profile Strategy for Rapid Growth

Yu-Tzu Lin, National Taiwan University, 1, Sec. 4, Roosevelt Rd., Taipei, Taiwan, d94725009@ntu.edu.tw, Ming-Hui Huang

Many IT firms pursue rapid growth through acquisitions. However, this is at the cost of high visibility that entails imitation and competition. This case study investigates one fast growing and highly profitable IT firm to understand how acquisitions can be a low profile strategy for rapid growth to avoid competition.

5 - A Network-based View of E-marketplace Operators in China

Hai-Sheng Huang, National Taiwan University, 1, Sec. 4, Roosevelt Rd., Taipei, Taiwan, huanghaisheng@msn.com, Ming-Hui Huang

The resource-based view of firm considers that firms gain competitiveness from owning resources. However, this view is giving way to the network-based view of e-marketplace where firms gain competitiveness from resource exchanges. This study examines the two competing explanations for e-marketplace operators in China where multinational and local operators proliferate.

MA20

H-Jade Suite 1

Financial Engineering and Markets

Cluster: Special Sessions
Invited Session

Chair: Hitoshi Takehara, Graduate School of Finance, Accounting and Law, Waseda University, 1-4-1 Nihombashi, Chuo-ku, Tokyo, Japan, takehara@waseda.jp

1 - Dynamic Financial Planning for a Household in a Multiperiod Optimization Approach

Norio Hibiki, Keio University, 3-14-1 Hiyoshi, Kohoku-ku, Yokohama, 223, Japan, hibiki@ae.keio.ac.jp, Nobuko Toyoda, Katsuya Komoribayashi

Financial planning tools can be used for giving a financial advice for a household. We describe the multiperiod optimization model to determine an optimal set of asset mix, life insurance and fire insurance in conjunction with wage income, consumption, and life plan of a household. Some practical examples are solved to illustrate the optimal financial plan.

2 - An Application of Impulse Control to an Optimal Prepayment Problem for Mortgage Loan

Muneki Kawaguchi, Mitsubishi UFJ Trust Investment Technology Institute Co., Ltd, 2-5-6 Shiba, Minato-ku, Tokyo, 105-0014, Japan, kawaguchi@mtec-institute.co.jp, Hidetoshi Nakagawa

We apply impulse control approach to the problem of finding an optimal prepayment strategy of mortgage to maximize a borrower's utility under some constraints. As type of prepayment, we consider partial prepayment as well as refinance. We discuss the properties of optimal prepayment by analyzing quasi-variational inequalities numerically.

3 - Solving a Maximal Predictability Portfolio Model - Algorithm and Evaluation

Rei Yamamoto, Department of Industrial and Systems Engineering, Chuo University and Mitsubishi UFJ Trust Investment Technology Institute Co., Ltd, 5-6, Shiba 2-Chome, Minato-Ku, Tokyo, 105-0014, Japan, rei@kc.chuo-u.ac.jp, Hiroshi Konno, Daisuke Ishii

We will present an algorithm for solving a maximal predictability portfolio (MPP) problem proposed by Lo and MacKinlay, which is a typical non-convex fractional programming problem. Our algorithm can generate a globally optimal solution fast. Also, we compare MPP portfolio and mean-variance (MV) portfolio using real stock data.

4 - Investigating Duration Structures of the Stock Markets

Akifumi Isogai, Mitsubishi UFJ Trust Investment Technology Institute Co., Ltd, 2-5-6 Shiba, Minato-ku, Tokyo, 105-0014, Japan, isogai@mtec-institute.co.jp, Toshifumi Tokunaga, Satoru Kanoh

The duration dependence of stock market cycles has been investigated using the Markov-switching model where the market conditions are unobservable. We extend the conventional model in which some restrictions are imposed. Duration analysis using the extended model finds the duration structures that cannot be described by the conventional models.

5 - Cost of Capital, Economic Dynamics, and the Effect of Tax Rate Changes

Hitoshi Takehara, Graduate School of Finance, Accounting and Law, Waseda University, 1-4-1 Nihombashi, Chuo-ku, Tokyo, Japan, takehara@waseda.jp, Keiichi Kubota

We estimate the expected equity premium for Japanese firms using the conditional version of Fama and French's (1993) factor model, and compute the marginal cost of capital using the Graham's (1996) simulation method. We also examine the effects of the corporate and income tax rate changes on the cost of capital.

■ MA21

H-Jade Suite 2

Finance I

Contributed Session

Chair: Jiang Xiaodong, School of Business Administration, Shanghai University of Finance and Economics, #777 Guoding Road, Shanghai, China, Shanghai, 200433, China, jxd@mail.shufe.edu.cn

1 - Random Effects Logistic Regression Model For Default Prediction of Technology Credit Guarantee Fund

Hong Sik Kim, Yonsei University, 134 Shinchon-dong, Seodaemun-gu, Seoul, Seoul, South Korea, khs05@yonsei.ac.kr, So Young Sohn

In this paper, we provide a random effects logistic regression model to predict the default of funded SMEs based on both financial and non-financial factors. Advantage of such a random effects model lies in the ability of accommodating not only the individual characteristics of each SME but also the uncertainty that cannot be explained by such individual factors.

2 - Announcement Effect of Seasoned Equity Offerings in the Japanese Market

Keiji Abe, Associate Professor, Takasaki City University of Economics, 1300 KamiNamie, Takasaki City, 3700801, Japan, abek@tcue.ac.jp, Masaaki Saito, Yasunori Katsurayama

There are many papers which report the negative announcement effect of SEO (Seasoned Equity Offering) market in US. Unfortunately a few empirical researches are found in Japanese SEO. In this presentation we show the announcement effect in Japanese SEO market based on daily rate of return from 1970's to early 2000's.

3 - Compare Neural Network and Regression in Stock Exchange Price Forecasting

Shadi Haghdoost, MS, IAU, Islamic Azad University-Science and Research, Tehran, Iran, atoloie14@yahoo.com, Abbas Toloie Eshlaghi

In recent years, many attempts have been made to use neural networks in stock market predictions. In this paper we compare neural networks forecasts of 3 years ahead in the IRAN stock exchange with the forecasts obtained using linear regression. We study the effects of some daily variables for 5 companies. We create feedforward, 3 layered with 7 hidden layers. The results show that the neural networks are better than regression.

4 - Process Design of Financial Collaborating Supervision under E-government Environment

Fan Jing, Antai School of Management, Shanghai Jiaotong University, No535, Fa Huazheng Road, Shanghai, 200052, China, fi1201@sju.edu.cn, Yaowen Xue, Pengzhu Zhang

Increasing supervision efficiency is the new requirement of financial supervision institutions under e-government environment. Based on the information sharing mechanism, this paper develops a process model of collaborating supervision for abnormal capital flow. In the proposed model, the abnormal capital in financial market is identified by exploiting the sharing information among different financial supervision institutions and different government departments, such as police department, revenue office, and commercial office. The efficiency and validity of the proposed model is investigated by a simulation experiment. The experimental results show that the proposed method can improve the efficiency, harmony and security of financial supervision by using the information sharing among different government departments.

5 - An Empirical Study on Investors' Overconfidence In the Case of Fujian Investors

Jiang Xiaodong, School of Business Administration, Shanghai University of Finance and Economics, #777 Guoding Road, Shanghai, China, Shanghai, 200433, China, jxd@mail.shufe.edu.cn

The theory and empirical studies on investor's overconfidence were reviewed, followed by an empirical study on two propositions about overconfidence using Fujian investor's trading accounts data. Lastly, conclusions and its revelations are presented.

Monday, 10:00am - 11:30am

■ MB01

S-Tang II

Innovations in Design of Experiments

Cluster: Quality, Statistics and Reliability - Joint Invited/Sponsored

Chair: Geoff Vining, Professor and Head, Virginia Tech, Department of Statistics, Hutcheson Hall, Blacksburg, VA, 24061, United States, vining@vt.edu

1 - Exact Tests for Split-Plot Response Surface Models

Scott Kowalski, Minitab Inc., 1611 Silk Tree Circle, Sanford, FL, United States, SKowalski@minitab.com, Geoff Vining

Split-plot experiments arise in industry when the nature of the experiment forces some factors to be hard-to-change, which leads naturally to a split-plot experiment. One approach for designing response surface experiments within a split-plot structure guarantees that the OLS estimates of the model are equivalent to the GLS estimates. This talk uses this result to derive conditions for exact tests of most of the model parameters.

2 - Design of Experiments in Computer Simulation

Shu Yamada, Associate Professor, University of Tsukuba, Otsuka 3-29-1, Tokyo, 1120012, Japan, shu@mbaib.gsb.tsukuba.ac.jp, Hiroe Tsubaki

This paper presents an approach of design of experiments to computer simulation with some case studies in automobile industry. For example, in order to optimize a response by many factors, the first step is to find active factors from many candidate factors. Supersaturated design is helpful for this screening problem. The next step is approximation of the response. Uniform design is helpful to fit a complicated model as an approximation.

3 - Case Studies from the Pharmaceutical World

Jørgen Iwersen, Principal Scientist, Novo Nordisk A/S, Sauntesvej 13, SAA2.32, Gentofte, NA, 2820, Denmark, jiw@novonordisk.com

Experimental designs have a storied history in discovery and development areas of all major pharmaceutical companies. In this talk, we consider two production related case studies. First the use of experimental designs to validate process windows in a large scale validation study. Next we consider an intercalibration study for a number of laboratories, on three continents. Both examples are discussed using original data.

■ MB02

S-Tang I

Intelligent Fuzzy Systems and Applications

Cluster: Fuzzy Sets and Systems

Invited Session

Chair: Cheng-Feng Hu, Professor, I-Shou University, Dept. of IE & Management, Kaohsiung, Taiwan, чу1@isu.edu.tw

1 - An Electromagnetism-like Mechanism based Fuzzy Neural Network for Learning Fuzzy IF-THEN Rules

Yung-Yao Hung, Department of Industrial Engineering and Management, I-Shou University, Kaohsiung County, Taiwan, d9320001@stmail.isu.edu.tw, Peitsang Wu, Zi-Po Lin

The purpose of this study is developing an electromagnetism-like mechanism based fuzzy neural networks (EM-initialized FNN) with fuzzy weights, and employ this model to train fuzzy if-then rules for learning expert knowledge. The performances of these fuzzy neural networks were investigated in this study by comparing with conventional FNN, GA-initialized FNN and EM-initialized FNN which is proposed by other researchers. We found out that EM-initialized FNN is better than other FNN models.

2 - An Enhanced Fuzzy Time Series Forecasting Approach - Using Trapezoidal Fuzzy Numbers

Hao-Tien Liu, Associate Professor, Department of Industrial Engineering and Management, I-Shou University, Kaohsiung County, Taiwan, htliu@isu.edu.tw

The aim of this research is to design an enhanced fuzzy time series forecasting method in which the forecasted value will be a trapezoidal fuzzy number instead of a single-point value. A numerical data set was employed to illustrate the proposed method and compare the forecasting accuracy with two fuzzy forecasting methods. The results of the comparison indicate that the proposed method can generate more accurate forecasting values.

3 - A Study on the Fuzzy Integer Programming Problems

Yi-Hua Kuo, Department of Industrial Engineering and Management, I-Shou University, Kaohsiung County, Taiwan, yihuakuo@hotmail.com, Peitsang Wu

In this research, we study several models of fuzzy integer programming (FIP). Integer programming models with soft constraints are discussed. First, we introduce some approaches to solve fuzzy linear programming problems presented before. Then we discuss the fuzzy IP problems by using the Branch and Bound Algorithm. Illustrated examples are examined by each algorithm. And finally, a practical problem is studied.

■ MB03

S-Ballroom A

Supply Chain Simulation

Sponsor: Simulation

Sponsored Session

Chair: Young Lee, IBM Research, 1101 Kitchawan Road, Yorktown Heights, NY, United States, ymlee@us.ibm.com

1 - A Simulation Study of Bullwhip Effect In A Supply Chain with Stochastic Lead Time

Raghu N. Sengupta, Assistant Professor, IIT Kanpur, Dept. of IME, IIT Kanpur, Kanpur, UP, 208016, India, raghus@iitk.ac.in, Kripa Shanker, Sunil Agrawal

The effect of stochastic lead time for a two-stage serial supply chain is studied for a correlated demand process where the lead time for the retailer is stochastic. An expression of the lead time demand (LTD) distribution is shown for the case when lead time is gamma distributed and the end customer demand is assumed to be an AR(1) process. Further, a simulation study is performed to see the effect on the decision variables.

2 - Bullwhip Effect Simulations on a Supply Chain Network

Yuh-Jen Cho, Assistant Professor, Chung Hua University, 707, Sec.2, Wu Fu Rd., Hsin Chu, TW, 300, Taiwan, yjcho@chu.edu.tw, Ying-Hsuan Yang, Hsu-Ping Wang, Chia-Yun Hsu

This paper reports some simulation results of bullwhip effect on a five-hierarchy supply chain network which consists of three suppliers, two manufacturers, one distributor, three wholesalers, and nine retailers. The simulation model is built on the Microsoft Excel software and coded by VBA language. Different lead times and order strategies are set to members in the supply chain network. Sensitivity analysis of the inventory control performance and bullwhip effect are presented.

3 - SmartSCOR - A SCOR-Based SCM Transformation and Application to IBM's Supply Chain

Jin Dong, Research Staff Member, IBM China Research Lab, Zhong Guang Cun Software Park, Haid, Tower A, Diamond Building, Beijing, CN, 100094, China, dongjin@cn.ibm.com, Brian Eck

Transformation is increasingly critical to today's IBM Supply Chain. We describe IBM's early and evolving use of the SCOR framework, and synergy with other work, culminating in a new tool called SmartSCOR. We offer a framework for On-Demand problem-solving, incorporating optimization/simulation techniques. SmartSCOR drives transformation at two levels: strategy design and process improvement. These interact with each other and result in a profound yet smooth transformation.

4 - Analysis of RFID Benefits using a Business Value Model with Supply Chain Simulation

Ying Tat Leung, IBM Almaden Research Center, 650 Harry Road, San Jose, CA, 95120, United States, ytl@us.ibm.com, Feng Cheng, Young Lee

To facilitate the development of a business case to analyze the financial return of Radio Frequency Identification technology (RFID) in a supply chain, we developed a tool set to quantitatively show the value of RFID to different parties in a manufacturing-retail supply chain. The tool set consists of two tools which are logically linked: a spreadsheet based business value model and a simulation based business process model. Together they capture the full range of potential benefits of RFID.

■ MB04

S-Ballroom B

Enterprise Integration

Cluster: Enterprise Integration

Invited Session

Chair: Thomas Gullledge, Professor, George Mason University, Enterprise Engineering Laboratory, Mail Stop 3C6, Fairfax, VA, 22030, United States, gullledge@gmu.edu

1 - Business Process Reference Models: Knowledge Assets for Agility

Mathias Kirchmer, CEO, IDS Scheer Americas and Japan and Affiliated Faculty, Center for Organizational Dynamics, University of Pennsylvania, 1055 Westlakes Drive, Suite 100, Berwyn, PA, 19312, m.kirchmer@ids-scheer.com

Reference models deliver the building stones for the efficient and effective development of new advanced business models. They are knowledge assets for agility that allow an organization to plan fast and execute successfully in an on-demand world. The presentation defines and classifies business process reference models so that they can be used as knowledge assets and enabler of the agile enterprise.

2 - Enterprise Services Architectures and End-to-End Process Execution

Thomas Gullledge, Professor, George Mason University, Enterprise Engineering Laboratory, Mail Stop 3C6, Fairfax, VA, 22030, United States, gullledge@gmu.edu

The evolution of Enterprise Services is changing the approach to capability delivery. Enabling systems continue to migrate to process- and service-oriented solutions, requiring new approaches for architecting composite solutions. This presentation uses examples from our work to present the state-of-the art in architecting end-to-end solutions for delivering capability from the Original Equipment Manufacturer (OEM) to the customer.

■ MB05

S-Ballroom C

Optimal Decision-making Models in Supply Chains

Cluster: Supply Chain Models

Invited Session

Chair: Ming-Jong Yao, Associate Professor, Tunghai University, P.O. Box 985, Department of IEEL, Taichung City, TW, 40407, Taiwan, myao@thu.edu.tw

1 - Establishing the Evaluation Method of Competitiveness for Technical Professionals

Hsin-Yi Yen, Graduate Student, Feng Chia University, Department of Business Administration, Taichung City, TW, 40407, Taiwan, ycchou@thu.edu.tw

Technical professionals are a key factor in the growth of the high-tech industry. Therefore, by focusing on the evaluation items in past literatures and the OECD database, we have organized four factors that evaluate the competitiveness for technical professionals. By considering expert advices, we then used AHP to formulate the weight of each factor in order to establish the evaluation method of competitiveness for technical professionals.

2 - Analysis of Serial Inventory Systems with Batch Ordering and Nested Replenishment Schedule

Kevin H. Shang, Assistant Professor of Operations, Fuqua School of Business, Duke University, Fuqua School, Duke University, Durham, NC, 27708, United States, khshang@duke.edu

We consider an N-stage serial inventory system where material is produced/ordered in batches and replenished according to a nested schedule. Two models that consider different fixed costs are developed. We construct a lower bound to the optimal cost, an optimization algorithm, and a heuristic for both models.

3 - Solving the Joint Replenishment Problem with Warehouse-Space Restrictions Using a Genetic Algorithm

Ming-Jong Yao, Associate Professor, Tunghai University, P.O. Box 985, Department of IEEL, Taichung City, TW, 40407, Taiwan, myao@thu.edu.tw

This study is an extension of the Joint Replenishment Problem (JRP) that takes into accounts warehouse-space restrictions. In order to solve this problem, we propose a hybrid genetic algorithm (HGA) to minimize the total costs per unit time and to generate a feasible replenishment schedule without exceeding the available warehouse-space. By our numerical experiments, we demonstrate that the proposed HGA could effectively solve the JRP with warehouse-space restrictions.

■ MB06

S-Sung I

Retail Operations I

Cluster: Operations Management
Invited Session

Chair: Jan Fransoo, Professor, TU Eindhoven, P.O. Box 513, Pav F4, Eindhoven, NL-5600 MB, Netherlands, J.C.Fransoo@tm.tue.nl

1 - Responsive Pricing under Supply Uncertainty

Christopher Tang, Professor, UCLA Anderson School, 110 Westwood Plaza, Los Angeles, CA, 90095, United States, ctang@anderson.ucla.edu, Rui Yin

Consider a retailer orders a seasonal product from a supplier and sells the product over a selling season. While the product demand is known to be a linear function of price, the actual supply yield is uncertain. In this paper, we present a two-stage stochastic model for analyzing two pricing policies: No Responsive Pricing and Responsive Pricing.

2 - A Model for Shelf Stacking in Grocery Retail Stores: Potential for Efficiency Improvement

Karel van Donselaar, TU Eindhoven, P.O. Box 513, Pav E3, Eindhoven, NL-5600 MB, Netherlands, k.h.v.donselaar@tm.tue.nl, Rob Broekmeulen, Jan Fransoo, Tom van Woensel

In retail stores, shelf stacking typically forms the largest share of the operational costs. In this paper, a study of the shelf stacking process is presented. First, a conceptual model based on warehouse operations is derived. Secondly, by means of a motion and time study, data has been collected for dry groceries in four stores of two different European retail companies. Using regression, the developed model clearly demonstrates the impact of the most important drivers for stacking efficiency.

■ MB07

S-Sung II

Structural Modelling of Market Outcomes

Cluster: Practice/Strategic Marketing
Invited Session

Chair: Naufel Vilcassim, Professor of Marketing, London Business School, Regents Park, London, NW14SA, United Kingdom, NVilcassim@london.edu

1 - Empirical Analysis of Competitive Pricing Strategies with Complementary Product Lines

Seethu Seetharaman, Associate Professor, Jones Graduate School of Management, Rice University, P.O. Box 2932, Houston, TX, 77252, United States, seethu@rice.edu, Chakravarthi Narasimhan, Yu Ma

We estimate a cross-category econometric model of a household's incidence and brand choice decisions using scanner panel data on cake mix and frosting. Using the estimated demand model as an input, we estimate a pricing game that infers the nature of (1) wholesale pricing by manufacturers, (2) retail pricing by the retailer, and (3) vertical channel interactions.

2 - Forecasting Advertising Responsiveness for Short-Lifecycle Products

Jackie Y. Luan, Yale School of Management, jackie.luan@yale.edu, K Sudhir

One major challenge in marketing products with short life cycles (such as movies and DVDs) is to decide on the optimal advertising levels even before the product is launched and any sales data become available. This paper introduces a new methodology to forecast advertising responsiveness while correcting for the slope endogeneity bias usually ignored in conventional instrumental-variable methods. This procedure is applied to the increasingly profitable DVD market and yields interesting findings for entertainment marketing.

3 - Accounting for Product Availability in Structural Demand Models: An Application to the UK Confectionery Market

Naufel Vilcassim, Professor of Marketing, London Business School, Regents Park, London, NW14SA, United Kingdom, NVilcassim@london.edu, Hernan Bruno

When the availability of products vary over time, but such variations are ignored, it can result in biases when estimating structural discrete choice models from aggregate data. In this study, we propose a simulation method that corrects for varying levels of availability and show empirically that the estimated brand preferences and price elasticities change when availability is accounted for. This is in turn has implications for various policy simulations.

4 - A Structural Approach to Modeling Negotiated Prices of Automobiles

Yuxin Chen, Professor, New York University, Stern School, NY, ychen@stern.nyu.edu, Sha Yang, Ying Zhao

In this paper, we develop a structural approach to modeling negotiated prices of automobiles. Deriving explicitly from bargaining theory, we model negotiated prices as determined by the bargaining power of the seller versus the buyer and their reservation prices. To infer a buyer's reservation price, we utilize the preference information revealed in his/her observed vehicle choice. The resultant model incorporates both the price negotiation and the consumer utility maximization in jointly estimating the parameters that determine the bargaining power of sellers versus the buyers and their reservation prices.

■ MB08

S-Ching

Decision Making in Planning and Resource Allocation

Sponsor: Decision Analysis
Sponsored Session

Chair: Don N. Kleinmuntz, Strata Decision Technology LLC, 2001 S. 1st St. Suite 200, Champaign, IL, 61820, dnk@strata-decision.com

1 - Using Decision Analysis to Improve Resource Allocation: Lessons from US Hospitals

Don N. Kleinmuntz, Strata Decision Technology LLC, 2001 S. 1st St. Suite 200, Champaign, IL, 61820, dnk@strata-decision.com

Decision analysis for resource allocation involves prioritizing projects using mathematical optimization with standard decision analysis tools. A model is described for capital budget allocation that has been applied in over 750 hospitals. The discussion will emphasize implementation challenges.

2 - Decision Analysis Process for Oil and Gas Industry

Lev Virine, Value and Risk Product Development, Schlumberger Ltd., 600, 322-11 Ave S.W., Calgary, AB, Canada, lvirine@calgary.oilfield.slb.com

One of the main challenges in economic evaluation of oil and gas reserves is to provide accurate analysis of portfolio with large number of uncertainties. The proposed process includes economic evaluation and decline analysis, decision and risk analysis, and capital planning. Uncertainties for each project can be expressed as decision trees, results Monte Carlo simulation results, sets of project scenarios, etc. Based on this information capital planning engine generates optimal portfolio.

3 - Investments in a New Technological Infrastructure: The Use of Electre Tri Multiple Criteria Decision

Maria Augusta Soares Machado, Doutora, IBMEC-RJ, Av. Rio Branco 108 andar 18, Centro, Rio de Janeiro, RJ, Brazil, mmachado@ibmecrj.br, Walter Gassenferth, João Guerra Duarte Neto

This paper is to present a real successful case study on the application of a scientific method that helps in the decision-making process of a large Brazilian retailer company. Lojas Americanas S.A., a retailer chain with 111 stores in almost every state of Brazil, decided on the feasibility to invest in a new technological structure to be implemented in the organization's distribution centers through a multiple criteria decision-making method: the Electre Tri.

■ MB09

S-Ming I

New Developments in Scheduling and Supply Chain

Cluster: Scheduling
Invited Session

Chair: Chi To Ng, Associate Professor, Department of Logistic, The Hong Kong Polytechnic University, Daniel.Ng@inet.polyu.edu.hk

1 - Order Scheduling with Direct and Batch Deliveries

Guoqing Wang, Department of Business Administration, Jinan University, Guangzhou, China, tgqwang@hotmail.com, Li Jiandong

There are n orders to be processed by a single machine. Each order can be directly delivered to its customers, or several order can be delivered in batch to a distribution center and then to their customers. While direct and batch deliveries involve different delivery time and costs, and each order has to be delivered on time, the objective is to minimize the total delivery and order earliness costs. We analyze the problem complexity and develop algorithms to deal with it.

2 - Approximation Algorithms for a Symmetric Quadratic Knapsack Problem and its Scheduling Applications

Hans Kellerer, Dr., University of Graz, Universitätsstrasse 15, Graz, A-8010, Austria, hans.kellerer@uni-graz.at, Mikhail A. Kubzin, Vitaly Strusevich

A knapsack problem for minimizing a symmetric quadratic function is considered. This knapsack problem is relevant for several single machine scheduling problems. A polynomial-time approximation algorithm is given which delivers a constant worst-case performance ratio.

3 - An FPTAS for Certain Scheduling Problems Based on a Symmetric Quadratic Knapsack Problem

Hans Kellerer, Dr., University of Graz, Universitätsstrasse 15, Graz, A-8010, Austria, hans.kellerer@uni-graz.at, Vitaly Strusevich

We consider several problems of single machine scheduling, e. g. the problem of minimizing the total weighted earliness and tardiness with respect to a common due date. We give FPTAS for these problems by using connections to a certain quadratic knapsack problem.

4 - Supply Chain Network Design for a Communication Business

Bibo Yang, Department of Logistics, The Hong Kong Polytechnic University, Hung Hom, Kowloon, Hong Kong, lgtlybb@polyu.edu.hk

This research addresses the supply chain network design problem of a communication business. The supply chain provides both service and product to the customers. Although service generates the most profit, good product supplies may strength the service sales. We analyze the effect of the product supplies on the performance of the whole supply chain. This problem is formulated as a mathematics model. A supply chain network for this communication business is presented.

■ MB10

S-Ming H

Meta-heuristics

Cluster: Mathematical Programming/Optimization
Joint Invited/Sponsored

Chair: Prakash Mirchandani, University of Pittsburgh, Pittsburgh, PA, pmirchan@katz.pitt.edu

1 - Weight Annealing Heuristics for Solving the Two-Dimensional Bin Packing Problem

Kok-Hua Loh, PhD Candidate, R.H. Smith School of Business, University of Maryland, College Park, MD, 20742, United States, kloh@rhsmith.umd.edu, Bruce Golden, Edward Wasil

In this paper, we describe weight annealing heuristics and algorithms for solving the two-dimensional bin packing problem with and without the guillotine cutting or item orientation constraints. We then compare and contrast the results of weight annealing heuristics against that of other heuristics and an exact method in a computational experiment.

2 - An Ant-based Algorithm using an Exact LP-solver for Multi-level Capacitated Lot-sizing Problems

Christian Almeder, Assistant Professor, University of Vienna / Department of Business Studies, Bruenner Strasse 72, Vienna, 1210, Austria, christian.almeder@univie.ac.at, Richard F. Hartl

The main idea of this approach is to split the problem into two parts: (i) schedule the lots for each production step, (ii) determine the production quantities for those lots. For the first part an ant-based metaheuristic is used to determine the values of the binary decisions. The second part is solved using a standard LP-solver. With this algorithm it is possible to improve the results for several test instances (taken from Stadler, H., Operations Research 51 (2003), 487-502.)

3 - A Metaheuristic Approach for the Survivable Network Design Problem

Prakash Mirchandani, University of Pittsburgh, Pittsburgh, PA, pmirchan@katz.pitt.edu, Anant Balakrishnan, Mihai Banciu, Karolina Glowacka

We investigate complex cost and connectivity trade-offs that arise in survivable network design (SND) where edges are susceptible to failure. We develop several heuristic moves, and implement them in a metaheuristic framework that integrates ideas from tabu search and randomized algorithms. Our approach uses a novel, iterative tandem-tabu method for the SND problem in a hierarchical fashion. We test the effectiveness and robustness of our approach on large-scale instances of both low and high connectivity SND problems, and suggest how to extend it to other network design problems.

■ MB11

S-Boardroom

Optimal Bidding and Risk Management in Energy Markets

Sponsor: Energy, Natural Resources and the Environment
Sponsored Session

Chair: Shi-Jie Deng, Professor, School of Industrial and Systems Engineering, Georgia Institute of Technology, Atlanta, GA, United States, deng@isye.gatech.edu

1 - Optimal Timing and Portfolio Selection for a Static Volumetric Hedging Strategy in Electricity

Shmuel Oren, Professor, Univ. of California, Berkeley, Berkeley, CA, United States, oren@ieor.berkeley.edu, Yumi Oum

We derive a costless optimal payoff function and timing for hedging the wholesale price and consumption quantity risk of electricity procurement by a load serving entity offering fixed price electricity service to its retail customers. We also show how to replicate the optimal payoff structure with standard forward and options contracts.

2 - Uniform Price Auctions and Crossholdings are a Bad Combination

Albert Banal Estanol, Lecturer, City University of London, London, United Kingdom, A.Banal-Estanol@city.ac.u, Augusto Ruperez Micola

This presentation examines the issue of how crossholdings may enhance trading coordination under uniform and discriminatory auction rules in the electricity industry. We show that, under mild information inefficiency conditions:
1/ Uniform price auctions result in higher profits for crossheld firms, and,
2/ Profits for firm pivotal firms are increasing in the percentage of crossholdings. We illustrate those results with a simulation.

3 - Optimal Procurement of Reactive Power in Electricity Market

Jin Zhong, The University of Hong Kong, Dept. of EEE, The Univ. of Hong Kong, Hong Kong, jzhong@eee.hku.hk

An optimal reactive power procurement model will be proposed and presented for a deregulated electricity market to schedule the reactive power outputs of generators and other network compensation devices. Both power system operation requirements and the cost characteristics of different reactive power devices are considered in the proposed model. Uniform reactive power market prices are obtained for generators and other compensation devices.

4 - Optimal Bidding Strategy for a Hydro-Electric Power Generator Facing Multiple Markets

Shi-Jie Deng, Professor, School of Industrial and Systems Engineering, Georgia Institute of Technology, Atlanta, GA, United States, deng@isye.gatech.edu, Haibin Sun, Youxun Shen

We present a modeling framework for hydro-electric unit generation scheduling under multi-market uncertainty. We consider a profit-maximizing hydro-electric producer participating in the electricity energy spot market and ancillary service markets as a price taker. The impact of market uncertainty on the joint-optimization problem is investigated through a stochastic programming framework.

■ MB12

S-Celestial Court-Jade

Intelligent Manufacturing and Scheduling

Contributed Session

Chair: Tung-Hsu (Tony) Hou, Professor & Chair, Department of Industrial Engineering and Management / National Yunlin University of Science and Technology, 123 University Rd. Sec. 3, Douliu, Yunlin, 640, Taiwan, houth@yuntech.edu.tw

1 - Automatic Inspection of Mura Defect in Color Filter

Sih-Hong Chen, Graduate Student, Department of Industrial Engineering and Management, I-Shou University, No. 1, Sec. 1, Syuecheng Rd., DASHU Township, Kaohsiung County, 840, Taiwan, m9320011@stmail.isu.edu.tw, Yu-Min Chiang

A MURA defect is a blemish on the color filter (CF) surface. It is difficult to be recognized by human eyes since the little brightness difference. This research develops an automatic inspection system for MURA defects to overcome the drawbacks of human inspection. The study utilizes Gaussian blurring technique to filter out regular patterns in a CF image thus the MURA defect is strengthened. We also develop a thresholding method based on statistics to separate MURA defects from the background.

2 - A Method for Detecting Significant Points in the Human Images

Jia-Yu Wu, Student, I-Shou University, No. 1, Sec. 1, Syuecheng Rd., Dashu Town, Kaohsiung, Taiwan, m9320004@stmail.isu.edu.tw, Wen-Yen Wu

In this paper we propose a method to detect the significant points in the human images. The images are acquired by a CCD camera and are converted into the HSV color format. The significant points in body's joints are then extracted using the color information. After divided points into clusters, the identification of significant points is based on the geometric relations of the points. The experimental results indicate that the proposed method is effective.

3 - A Method for Inspecting the Surface Mounted Components

Cheng-Yo Lee, Student, I-Shou University, No. 1, Sec. 1, Syuecheng Rd., Dashu Town, Kaohsiung, Taiwan, m9320012@stmail.isu.edu.tw, Wen-Yen Wu

In this paper we propose a method to inspect the surface mounted components. Two types of components inspecting are quad flat package (QFP) and small outline package (SOP). The inspecting procedures consist of four steps: image grabbing, image segmentation, defect detection, and defect classification. The experimental results show that the proposed method can detect the defects of the surface mounted components effectively.

4 - A Vision-based Driver Assistant System for Finding the Collision Avoidance Path

No-Jen Hsu, Graduate student, Department of Industrial Engineering and Management, I-Shou University, No. 1, Sec. 1, Syuecheng Rd., Dashu Township, Kaohsiung County, 840, Taiwan, m9420001@stmail.isu.edu.tw, Yu-Min Chiang

The purpose of the research is to develop a vision-based driver assistant system (DAS) to enhance the traffic safety and raise the competitiveness of the automotive accessory industry. The DAS is built by utilizing a single camera and it consists of several modules such as sensor driving, image graying, feature detection, lane detection, lane tracking, and guiding modules. Main function of the system is to find the collision avoidance path by obstacle detection and lane tracking.

5 - An Integrated System for Optimizing the Nano-Particle Milling Process with Multiple Responses

Tung-Hsu (Tony) Hou, Professor & Chair, Department of Industrial Engineering and Management / National Yunlin University of Science and Technology, 123 University Rd. Sec. 3, Douliu, Yunlin, 640, Taiwan, houth@yuntech.edu.tw, Chi-Hung (Jerry) Su

In this study, we propose a non-dominated sorting genetic algorithm (NSGA- ϵ^0) combined with response surface method (RSM) to find the optimal process parameters for nano-particle milling process. The model of RSM is used as the fitness function and we apply two criteria to measure the performance in NSGA- ϵ^0 . Finally, a post-optimization procedure is used to improve the quality of Pareto-optimal-front. The results show that it have good performance in convergence and diversity.

MB13

S-Celestial Court-Pearl

Contracting in Supply Chains

Contributed Session

Chair: Chunming Shi, WSU, Department of Management and Operations, Washington State University, Pullman, WA, 99163, United States, shicm@wsu.edu

1 - A Strategic Analysis of the Long-Term Contract for a Manufacturing System

Liuxin Chen, PhD student, Chinese University of Hong Kong, Shatin, N.T., Hong Kong, Hong Kong, lxchen@se.cuhk.edu.hk, Youyi Feng

We consider a make-to-stock manufacturing system which produces and markets a product. The product can be sold to a local market. It is also demanded by certain OEM through a long-term contract. To maximize the long-run average profit, we show that a threshold policy optimizes its production and pricing actions. In addition, we find that the firm can determine an optimal supply curve before negotiating the contract with OEM and make contract deal based on the curve.

2 - What if the Breach of Supply Contract is Valuable?

Cagri Haksoz, Dr, Cass Business School, 106 Bunhill Row, London, EC1Y 8TZ, United Kingdom, c.haksoz@city.ac.uk, Sridhar Seshadri

In this talk, we provide recent research results in supply chain contracts from a valuation perspective. We study the design and valuation of a "breach of contract" option that is embedded in a long-term supply chain contract. We evaluate and discuss the importance of this option and summarize the managerial insights.

3 - Study on the Optimization and Coordination of the Supply Chain in VMI Situation

Hui Hu, Study on the Optimization and Coordination of the Supply Chain in VMI Situation, Institute of System Engineering, Traffic and Transportation School of Beijing Jiaotong University, HaiDian District., Beijing, 100044, China, huhui0414@163.com

The paper concentrates on the issue of optimization and coordination of the supply chain, especially in VMI (Vendor Managed Inventory) situation. The theory of Complex Adaptive System (CAS) is applied as framework to study the problem and conceptual model of the supply chain is given. The coordination mechanism of members is analyzed with multi-agent tools. Finally a food manufacturer is modeled as case study, where the optimal solution and benefits from collaboration are found.

4 - Use Quantity Flexibility Contract to Coordinate a Supply Chain with Satisficing Objectives

Chunming Shi, WSU, Department of Management and Operations, Washington State University, Pullman, WA, 99163, United States, shicm@wsu.edu, Shilei Yang

We analyze a decentralized supply chain consisting of one supplier and one retailer under a quantity flexibility contract. We first study the supply chain when each agent adopts a satisficing objective. It is shown that a quantity flexibility contract has to degenerate into a wholesale price contract to coordinate the supply chain. We then study the supply chain coordination when each agent adopts the objective of expected profit maximization subject to a downside-risk constraint.

MB14

S-Celestial Court-Coral

Operations Research & Management Applications in Mexico

Cluster: Medical Applications

Invited Session

Chair: Idalia Flores, PhD, Universidad Nacional Autonoma de Mexico, Plazuela de los Reyes 45-B301, Los Reyes Coyoacan, Mexico, DF, 04330, Mexico, idalia@servidor.unam.mx

1 - Statistical Analysis of the Integral System of Attention to Medical Emergencies of SISTEMEDIC

Irma Glinz, PhD student, Universidad Nacional Autonoma de Mexico, Mexico, Mexico, iglinz@hotmail.com, Armando Álvarez

This document gives an statistic application in the Pre-hospitable Medical Attention of Emergencies System named SISTEMEDIC, that has been operating in the metropolitan zone of Mexico City for 20 years; it analyzes the behavior of the emergency medical cases, provides the probability that an event happens and offers a solid support to minimize the costs of the required inventory.

2 - A Simulation of the Outpatients' Service in the University Medical Center

Idalia Flores, idalia@hotmail.com, Mayra Elizondo

The Medical Center of the National University has outpatients' service attending 250 000 people. When a diagnosis was made to improve the planning, it was found to perform badly. To obtain greater in-depth knowledge and measure the attention given to outpatients, a discrete simulation model was developed using discrete parameters. Then this model was used to draw up a proposal for the improvement of this important service.

3 - Medical Planning for a University Medical Center

Esther Segura, PhD student, Universidad Nacional Autonoma de Mexico, esthersp_1976@yahoo.com.mx, Idalia Flores

In order to meet Mexican official standards of quality and improve its services, a team of the Department of Operations Research were asked to make a diagnosis on the performance of this center. As a result, it was developed and applied quantitative planning techniques to measure the quality of the services. The following is the methodology that was used and the proposal that was drawn up to achieve this goal.

■ MB15

S-Celestial Court-Amber

Managing New Product Development

Contributed Session

Chair: Murat Bayiz, Marshall School of Business, University of Southern California, Los Angeles, CA, 90089, United States, murat.bayiz@marshall.usc.edu

1 - An Approach to Optimizing Design of Computer Games

Feng-Liang Lee, Instructor, Department of Management Information Systems / Far East College, No. 49, Chung-Hua Road, Hsin-Shih., Tainan County., TW, 744, Taiwan, fengl@cc.fec.edu.tw, Muh-Cherng Wu, Shang Hwa Hsu

This paper presents an approach to solve the trade-off decisions in designing a computer game. The approach applies the neural network technique and develops a genetic algorithm to optimize the design. By this approach, a near-optimal design alternative can be identified in a timely fashion. Keywords: Neural networks; Genetic algorithms; Optimization; Computer game

2 - Product Line Design Problem with Multiple Custom and Common Attributes

Kilsun Kim, Professor, Sogang University, College of Business, 1 Shinsudong Mapoku, Seoul, 121-742, South Korea, kilsunkim@sogang.ac.kr, Dilip Chhajed

Use of common features among products in a line is a popular design practice and examples are in many product categories. We present an analytic model of product line design with multiple attributes that addresses the tradeoff relationship associated with commonality: cost saving vs. product differentiability. From the model, we derive the specifications of optimal product line design, and show how the commonality affects the implementability of the first best solution.

3 - A Simulation Model of Cooperation in the Product Development Process

Jun Lin, National University of Singapore, QRE Lab, ISE Dept., Engineering, NUS, Singapore, Singapore, linjun@nus.edu.sg

This paper goes beyond the common recommendation to improve the cooperation among development teams as much as possible. We present a model-based framework to investigate the relationships between cooperation and project performance (in terms of cycle time, quality, and cost), so that managers can evaluate whether the benefit overwhelms the investment involved. With the support of a design company, we develop and validate the model with data from mobile phone development projects.

4 - Incentive Contracts in Project Networks

Murat Bayiz, Marshall School of Business, University of Southern California, Los Angeles, CA, 90089, United States, murat.bayiz@marshall.usc.edu

This study explores incentive contracts in project management using a principal multi-agent framework. I assume that activity durations are exponentially distributed, which enables transforming any project network to a continuous time Markov chain. I used this structure to derive closed form solutions for the optimal contract parameters and study how the optimal contracts are different for parallel and serial activities in the same project network.

■ MB16

S-Celestial Court-Amethyst

Applications on Semiconductor Manufacturing

Contributed Session

Chair: Linguo Gong, Associate Professor, Rider University, Rider University, 2083 Lawrenceville Road, Lawrenceville, NJ, 08648, United States, lgong@rider.edu

1 - A Scheduling Scheme for Parallel Machines where Jobs Demand Repetitive Processing

Seok Chan Kang, Korea University, gonghakkwan 550ho An-am 5 ga sungbuk gu, Seoul, South Korea, kang0034@hanmail.net, yong ha Kang, Sung-Shick Kim

This paper addresses a heuristic algorithm that minimizes total tardiness on identical parallel machines where jobs demand repetitive processing. The proposed algorithm consists of 2 phases. In the first phase, a reentrant order with cyclic process is divided into a number of jobs. An solution is obtained by a Revised ATCS rule in the second phase. It is shown that the proposed algorithm outperform other algorithm in a wide range of problem settings.

2 - An Algorithm for TFT-LCD Plate-Mapping Process

Muh-Cherng Wu, Professor, Department of Industrial Engineering and Management / National Chiao Tung University, 1001, Dah-Shei, Rd, Hsin-Chu, TW, 300, Taiwan, mcwu@cc.nctu.edu.tw

The manufacturing of TFT-LCD involves a cell process, which is to mate a TFT plate with a CF (color filter) plate. A typical TFT/CF plate comprises 6-30 panels.

Such a mated panel is defective in quality when any one of the two panels is defective. How to mate the TFT/LCD plates, also called the plate-mapping problem, is thus very important to achieve a high yield. This research proposes a linear program, embedded with a heuristic procedure to quickly solve the plate-mapping problem.

3 - Innovative Process Improvement Using Linear Programming: A Case Study of Thai Semiconductor Industry

Montri Damrongwongsiri, PhD., Graduate School of Management and Innovation, King Mongkut's University of Technology Thonburi, CB5, 8th Floor, 91 Prachauthit Rd., Thung Khru, Bangkok, 10140, Thailand, d_montri@yahoo.com, Arnut Euajongmanee

This study illustrates the case of one semiconductor company in Thailand. The company experiences that the production planning in wire bonding unit does not correspond to the available resources. This issue results in an ineffective output of production compared to the customer order. To solve this problem, linear programming is used for decision making as a product mix model. The answer demonstrates the product mix solution which maximizes profit to the company.

4 - The Effect of Testing Equipment Shift on Optimal Design of a Repetitive Testing Process

Linguo Gong, Associate Professor, Rider University, Rider University, 2083 Lawrenceville Road, Lawrenceville, NJ, 08648, United States, lgong@rider.edu

Repetitive testing process is commonly used in final testing of Chip productions to ensure high outgoing quality. Testing lot size and repetitions determines the testing process effectiveness and is difficult to determine due to various uncertainties. We develop a cost model that optimally determines the repetitive testing rule of a process where testing equipment shifts randomly. We discuss effects of equipment shift rate, testing errors, costs on system performance.

5 - Application of Scheduling Technique on Dynamic Layout Problem of a Factory

Zih-Ping Ho, PhD Student, Tunghai University, No.181, Sec.3, Zhong-Gang Rd., Tunghai U, Tai-Zhong, TW, 407, Taiwan, d923304@thu.edu.tw, Chyuan Perng

In a factory, the strategies of dynamic layout problem (DLP) are important to the semi-conductor assembly factories. This research investigated the use of a scheduling technique to compare the performance of each family-based scheduling rule in DLP. Through system validation, we designed a system with PHP language to provide decision support to production manager. It assigns orders to the appropriate locations based on the space, work-in-progress (WIP), due day, and processing time.

■ MB17

H-Crystal Room 1

Advanced Planning: Models and Techniques

Cluster: Supply Chain Planning & Advanced Planning Systems
Invited Session

Chair: Bernhard Fleischmann, Professor, University of Augsburg, Universitätsstrasse 16, Augsburg, 86356, Germany, Bernhard.Fleischmann@wiwi.uni-augsburg.de

1 - Continuous-Setup Lot-sizing and Scheduling on Parallel Machines with Sequence-Dependent Setups

Sungmin Kang, Professor, The Catholic University of Korea, 43-1 Yokkok, Buchon, Seoul, South Korea, skang@catholic.ac.kr

We propose a new model for the capacitated lot-sizing and scheduling problem on multiple machines with sequence-dependent setup times and setup costs. Setup states are preserved over idle periods and setups are allowed to split in two consecutive periods.

2 - Multi-Agent Systems for Supply Chain Management: A Survey

Guobing Rong, Alfred Weber-Institute of Economics, University of Heidelberg, Grabengasse 14, Heidelberg, BW, 69117, Germany, guobing.rong@uni-hd.de

Multi-Agent Systems (MAS) offer new perspectives compared to conventional, centrally organized architectures to support supply chain management (SCM). In this paper, we at first give a brief survey of issues of existing SCM systems, and then show the potentials of the agent technology. Following this, we review existing related MAS research projects and commercial systems to support SCM and Advanced Planning. Finally, we analyze some key issues and limitation of existing MAS approaches.

3 - Global Network Design in the Automotive Industry

Bernhard Fleischmann, Professor, University of Augsburg,
Universitätsstrasse 16, Augsburg, 86356, Germany,
Bernhard.Fleischmann@wiwi.uni-augsburg.de

For a car manufacturer, decisions on the allocation of future products and components to production sites and the corresponding investments in production capacity are critical. Globalization of production, suppliers and markets as well as the increasing variety of products have augmented the complexity of this task tremendously. We discuss the requisites for decision support models, present modeling techniques, and report on several applications in practice.

4 - Scheduling a Semiconductor Back-End: From Theory to Practice

Daniel Quadt, Infineon Technologies AG, Wernerwerkstr. 2,
Regensburg, DE, 93049, Germany, daniel.quadt@infineon.com

We present a novel scheduling procedure for a semiconductor back-end. Existing procedures fail to deliver good schedules for various reasons. We report on some experience and problems with a commercially available scheduling system. The new algorithm is based on a Simulated Annealing approach and a novel representation scheme. It takes all the important characteristics of a semiconductor back-end into account.

■ MB18

H-Crystal Room 2

Logistics Management: Challenges and Opportunities

Cluster: Shipping, Transport and Supply Chain Logistics
Invited Session

Chair: Kee-hung Lai, Assistant Professor, The Hong Kong Polytechnic University, Hung Hom, Kowloon, Hong Kong, China, lgtmlai@polyu.edu.hk

1 - ISO 9000 and Operating Cycle Time: The Implications in Supply Chain Management

Chris Lo, Doctoral Student, The Hong Kong Polytechnic University, Hung Hom, Kowloon, Hong Kong, China, lgtchrlo@polyu.edu.hk, Andy C.L. Yeung

ISO 9000 is a popular quality management system that diffuses across the supply chain. ISO 9000 aims to improve the operational performance of certified firms and to simplify the supplier selection process in the global supply chain. However, there are few quantitative studies that focus on its impact on the supply chain performance. In this paper, we compared the operating cycle time of ISO 9000 certified manufacturing firms in Hong Kong and China to a sample of control firms. We analyzed 188 companies. The preliminary results of a cross-sectional study of the year 2003 suggested that the ISO 9000 certified firms have longer operating cycle time than the non-ISO 9000 certified firms. This contradicts to the general expectation that ISO 9000 improves the operational performance of the company. We believe that such a contraction is due to the trade-off between the adoption of institutionalized rules and technical efficiency as explained by institutional theory.

2 - Institutional Isomorphism and the Adoption of Technology for Container Transport Security Enhancement

Venus Lun, Lecturer, The Hong Kong Polytechnic University, Hung Hom, Kowloon, Hong Kong, China, lgtvlun@polyu.edu.hk, T.C. Edwin Cheng, Kee-hung Lai

The adoption of technology for security enhancement by actors along a container transport chain has become a necessity for enhancing container transport security. Actors, such as shippers, consignees, freight forwarders, transport operators, maritime carriers, container terminal operators, custom authorities and government agencies, in a container transport chain adopt technology, such as RFID technology, smart box concept, and container inspection technology, due to the institutional pressure exerted by other actors in the container transport chain. In this paper, the implications of the different types of institutional isomorphism, namely coercion, mimesis, and norms, are explored from both the perspectives of firms that have taken the initiatives to adopt technology for security enhancement and those that have followed other firms to adopt technology. The possible impact of the different types of institutional isomorphism discussed here can help managers to better understand the institutional pressure they are putting on and adapting to their container transport chain partners, in particular, the possible problems and the compliances they may face in the course of adopting technology for enhancing maritime security.

3 - Managerial Issues of Information Technology Evolution in Logistics & Supply Chain Management

Pui Yuk, Simon Chan, Hong Kong Baptist University, WLB 921, Shaw Campus, HKBU, Kowloon Tong, Hong Kong, 03414426@hkbu.edu.hk, Shi Xinping

This paper describes the evolution and growth of information technology (IT) in the supply chain. It also discusses the managerial issues of IT evolution in logistics and supply chain management with different partners, i.e. suppliers,

organizations and users. The paper also discusses the impact of IT strategies on logistic and supply chain management.

4 - The Complementarities of Information Systems Management and Supply Chain Management

Christina Wong, Doctoral student, The Hong Kong Polytechnic University, Hung Hom, Kowloon, Hong Kong, China, lgtchris@polyu.edu.hk, Kee-hung Lai, T.C. Edwin Cheng

Although prior research has generated considerable knowledge on the importance of information systems management (ISM) and supply chain management (SCM) for improving business performance, the findings are at best inconsistent and at worst contradictory. This is because one of the key issues concerning the effectiveness of their implementation - the alignment of ISM and SCM practices - is under-explored. The lack of understanding of the alignment of the implementation of ISM and SCM practices has prevented the full exploitation of their complementarities that will contribute to improvements in business performance. Drawing on organization theory, this study attempts to a) examine the complementarities in the philosophical emphases of ISM and SCM, b) investigate how they could complement each other, and c) identify pertinent research questions and suggest a research agenda aimed at advancing knowledge on the alignment of ISM and SCM practices, hence enabling firms to attain better performance in their implementation efforts.

■ MB19

H-Crystal Room 3

Implementation and Effect of E-Business Technology

Cluster: Information Systems and Electronic Commerce
Invited Session

Chair: Eric Wang, Professor & Dean, National Central University, School of Management, National Central University, Chungli, 32054, Taiwan, ewang@mgt.ncu.edu.tw

1 - The Impact of Leadership and Conflict on Member Satisfaction

Huey-Wen Chou, Professor, National Central University, #300 Jung-Da Rd, Jung-Li, 32054, Taiwan, hwchou@mgt.ncu.edu.tw, Hsuan-Wei Chu, Ying-Jung Yeh

This study examined the effects of leadership style and conflict on member satisfaction. We examined if the relationship between leadership style and team satisfaction is partially mediated by team conflict. Survey responses were collected from one hundred and three samples in Taiwan. These results revealed that leaders should demonstrate more transformational leadership style in order to enhance member satisfaction and reduce the negative impacts of conflict.

2 - Effect of CRM Technology on Organization Performance: A Dynamic Marketing Capability Theory

Eric Wang, Professor & Dean, National Central University, School of Management, National Central University, Chungli, 32054, Taiwan, ewang@mgt.ncu.edu.tw, James J. Jiang

Based on the traditional 4P framework, this study proposes a dynamic marketing capability construct to reflect a firm's ability to dynamically adjust its marketing activities in response to changing environments. Its mediating effect between a firm's IT support for CRM and firm performance is examined and the implications provided.

3 - Website Design Feature Taxonomy Development: A Design Science Approach

Benjamin Yen, Associate Professor, The University of Hong Kong, School of Business, Pokfulam Road, Hong Kong, benyen@business.hku.hk, Paul Hu, May Wang

This study presents design science research that aims to improve Website design process by assisting in requirement solicitation and Website design specification. This research constructs a feature taxonomy that represents a Website and provides feature mappings across different Website development stages. A standard design research methodology was followed to identify the problem, to give suggestions, to develop the framework, to evaluate and make conclusion.

■ MB20

H-Jade Suite 1

Nonlinear Programming: Theory and Applications

Contributed Session

Chair: Takahito Kuno, Associate Professor, University of Tsukuba, Tsukuba, Ibaraki, 305-8573, Japan, takahito@cs.tsukuba.ac.jp

1 - Monomial Geometric Programming with Fuzzy Relation Equation

Jihui Yang, Doctor Student, Shantou University, Department of Mathematics, Shantou, GD, 515063, China, yangjihui@163.com, Bingyuan Cao

In view of the importance of monomial and fuzzy relation equation, a fuzzy relation geometric programming model with a monomial objective function subject to the latter is presented. The method to find an optimal solution is

expatiated based on solution set structure of fuzzy relation equation. And finally, the concrete examples are given for illustration its validity.

2 - Numerical Experiments with a Human Migration Model

Nataliya Kalashnykova, Associate Professor, University of Nuevo Leon (UANL), Cuidad Universitaria, Facultad de Ciencias Fisico-Matematicas, San Nicolas de los Garza, NL, 66415, Mexico, natanl@mail.ru, Vyacheslav Kalashnikov

A conjectural variations equilibrium technique is applied to a human migration problem. Necessary and sufficient conditions for the existence of the equilibrium are obtained, and a series of numerical experiments are conducted.

3 - On Approximating \mathcal{D} -induced Polar Sets Of Geometric and Extended Geometric Cones

Churen Sun, Lecturer, Shanghai Institute of Foreign Trade, 76-401, New Centurial Master (Kaiyuanxindu), Xialian Road, Songjiang District, Shanghai, 201600, China, sunchuren@sohu.com

This article investigates approximately describing the set

$\mathcal{M} = \{ \sum_{i=1}^n \lambda_i \vec{a}_i \mid \lambda_i \geq 0, \sum_{i=1}^n \lambda_i = 1 \}$ where \mathcal{K} is a geometric or extended geometric cone while \mathcal{U} is an ellipsoid. We show that this set can be polyhedrally approximated in polynomial time.

4 - Application of Bilevel Programming to a Gas Cash-Out Problem

Vyacheslav Kalashnikov, Assistant Professor, ITESM, Department of Systems Engineering, ITESM, Campus Monterrey, Monterrey, NL, 64849, Mexico, kalash@itesm.mx, Stephan Demepe

We model an applied problem as a mixed-integer bilevel program. To simplify it we move the Boolean variables from the lower to the upper level, investigate the implications of this change, and formulate conditions guaranteeing the existence of an optimal solution. Finally, we find bounds on the optimal value of the original problem.

5 - A Branch-And-Bound For Concave Minimization And Its Performance As A Heuristic Algorithm

Takahito Kuno, Associate Professor, University of Tsukuba, Tsukuba, Ibaraki, 305-8573, Japan, takahito@cs.tsukuba.ac.jp

In this talk, we propose a branch-and-bound algorithm for solving concave minimization problems. The relaxed LPs used in this algorithm are different only in the objective functions and inherit structures of the target, though the lower bounds somewhat disimprove. To eliminate this drawback, we introduce a Lagrangian-based procedure for tightening the lower bounds. We report some numerical results, and besides discuss the performance as a heuristic algorithm.

■ MB21

H-Jade Suite 2

Finance II

Contributed Session

Chair: Woojin Chang, Seoul National University, San 56-1 Sillim-dong, Kwanak-gu, Seoul, 151-742, South Korea, changw@snu.ac.kr

1 - The Pricing of Callable Russian Options

Atsuo Suzuki, Nanzan University, 27 Seirei-Cho Seto Aichi, Seto, Japan, d04mm001@nanzan-u.ac.jp, Katsushige Sawaki

In this paper, we discuss the pricing of Callable Russian options and their optimal boundaries for the seller and the buyer when the stock pays dividends continuously. Also we investigate some analytical properties of the value function.

2 - The Pricing of Knock-in-Linked Bonds

Toshikazu Inaguma, Nanzan University, 27 Seirei-cho Seto Aichi, Seto, Japan, m04mm012@nanzan-u.ac.jp, Katsushige Sawaki

In this paper, we consider a structured bond pricing model for valuing knock-in-linked bonds which were recently issued as one of complex hybrid securities. We show that such a structured bond can be decomposed into the sum of the values of a discount bond and European knock-in put option. Also, numerical examples are presented.

3 - Maximum Entropy Distributions and Derivative Security Prices

Naoya Takezawa, Assistant Professor, Nanzan University, 18 Yamasato, Showa-ku, Nagoya-shi, Aichi-ken, Japan, ntakezaw@ic.nanzan-u.ac.jp

The equity return distribution is often assumed to be Normal in many financial derivatives pricing models. We propose a model that extends the distribution class to maximum entropy distributions with additional constraints on moments that represent market expectation to better capture information shock events via the probability distribution.

4 - Using Futures Prices of One Commodity to Estimate the Stochastic Process of Another

Gonzalo Cortazar, Professor, Pontificia Universidad Catolica de Chile, Vicuna Mackenna 4860, Santiago, Chile, gcortaza@ing.puc.cl, Carlos Milla, Felipe Severino

Futures contracts for some commodities have maturities for only a few months while others reach several years. In this paper we use the Kalman filter to jointly estimate the stochastic process for two commodities, using the dynamics of one commodity to provide information on the price behavior of another.

5 - Estimation of Systematic Risk of Capital Asset Pricing Model using Wavelets

Woojin Chang, Seoul National University, San 56-1 Sillim-dong, Kwanak-gu, Seoul, 151-742, South Korea, changw@snu.ac.kr, Minhye Park

We suggest the method estimating systematic risk of Capital Asset Pricing Model (CAPM), beta, using wavelet transformation. As wavelet transform has orthonormal property and each level of wavelet coefficients corresponds to a range of periods in time domain, beta's of different periods can be computed in wavelet domain rather than time domain. Daily, weekly, and monthly beta's are computed at a time sequentially based on the wavelet coefficients of stock's daily return only.

Monday, 1:30pm - 3:00pm

■ MC01

S-Tang II

Panel Discussion: New Challenges and Trends of Six Sigma in Asia

Cluster: Quality, Statistics and Reliability - Joint Invited/Sponsored

Chair: Fugee Tsung, HKUST, IELM, HKUST, Clear Water Bay, Kowloon, HK, Hong Kong, season@ust.hk

1 - Panel Discussion: New Challenges and Trends of Six Sigma in Asia

Moderator: Fugee Tsung, HKUST, IELM, HKUST, Clear Water Bay, Kowloon, HK, Hong Kong, season@ust.hk, Panelists: Kwang-Jae Kim, POSTECH, Industrial & Management Engineering; Loon Ching Tang, National Univ. of Singapore; Albert Tsai, Merck; Elaine Wong, Sheraton; Shu Yamada, University of Tsukuba.

This panel will invite several Six Sigma research leaders and black belts from different countries (Singapore, Korea, Hong Kong, etc.) and different industries (especially in service, e.g., Healthcare and Hotel) to share their reviews on new challenges, methodologies, and visions in the development of Six Sigma in this region.

■ MC02

S-Tang I

Foundations and Applications of Fuzzy Sets and Systems

Cluster: Fuzzy Sets and Systems

Invited Session

Chair: Saowanee Lertworasirikul, Dr., Department of Product Development, Faculty of Agro-Industry, Kasetsart University, 50 Phaholyothin Rd., Ladyao, Chatuchak, Bangkok, 10900, Thailand, saowanee_98@yahoo.com

1 - On Fuzzy Data Envelopment Analysis

Ying-Ming Wang, Manchester Business School, The University of Manchester, Manchester, M15 6PB, United Kingdom, yingming.wang@manchester.ac.uk

Fuzzy data envelopment analysis (DEA) has been investigated and several models have been developed. This paper examines the rationalities of these models and proposes a new fuzzy DEA model. The new fuzzy DEA model uses a unified and deterministic production frontier to measure fuzzy efficiency. An analytical fuzzy ranking approach is developed to compare and rank fuzzy efficiencies of decision making units. Numerical examples are provided.

2 - Genetic Fuzzy Logic Incident Detection Systems

Yu-Chiu Chiou, Department of Traffic and Transportation Engineering and Management, Feng Chia University, Taiwan, ycchiou@fku.edu.tw, Ming-Te Wang, Yi-Lin Chen

This paper aims to develop a genetic fuzzy logic controller (GFLC)-based incident detection system. The state variables are partially chosen from the traffic information detected by vehicle detectors located at upstream and downstream of incident site. Five GFLC-based incident detection models: flow model, speed model, occupancy model, integrated model and extracted model (by principal components), are developed and compared with artificial neural network model by field incidents data in Taiwan.

3 - A Defuzzification Approach Based Fuzzy Multiple Levels MCDM Model

Ta-Chung Chu, Professor, Department of Management and Information Technology, Southern Taiwan University of Technology, 1 Nan-Tai Street, Yungkuang City, 710, Taiwan, tcchu@mail.stut.edu.tw, Yichen Lin

In some cases, criteria of fuzzy MCDM may have several sub-criteria, and sub-sub-criteria etc. Thus a fuzzy multiple levels MCDM model is needed. But if there are more than two levels in the criteria hierarchy, the multiplication of more than three fuzzy numbers can not be solved. Thus, it is necessary to defuzzify fuzzy numbers before establishing the model. This work suggests the ranking method of center of area, which has the merits of equally dividing the area under membership function.

■ MC03

S-Ballroom A

Modeling of Global Commerce Relevant Production and Business Events

Sponsor: Simulation
Sponsored Session

Chair: Roberto Lu, Associate Technical Fellow, The Boeing Company, P.O. Box 3707, Mail Code: 19-FA, Seattle, WA, 98124-2207, United States, roberto.f.lu@boeing.com

1 - Dynamic Capabilities in High Velocity Markets - Insight From a Simulation Study

Eugen Scheinker, PhD Student, University of Muenster, Germany, Leonardo Campus 19, Muenster, 48149, Germany, scheinker@ug.uni-muenster.de, Thomas Ehrmann

We analyze the implications of the dynamic capabilities (DC) concept in high velocity markets. The use of an evolutionary model allows the illustration of intra-industrial competition as well as the integration of most diverse concepts having been developed over the last years such as DC and capability lifecycle. With recourse to simulation-based analyses using the optimal control theory, we concretize the DC contribution and limitations as regards the development of competitive advantages.

2 - Optimal Pricing and Simulation of Distribution Systems with Variable Lead Time

Yingjun Wang, Professor, Shanghai University, 20 Chengzhong Rd, Jiading, Shanghai, 201800, China, yjwang@rocketmail.com, Yunfei Jiang

Given demand rate linearly related to the sales price at the retailer, the total profit model is established with decision variables (sales price and order quantities). Its distinct but nested solutions are obtained where fix-point principle can find a sound application. The optimal price and order quantities are simultaneously achieved via a fixed-point calculation. Furthermore, a concrete Algorithm is also provided. Simulation techniques are also applied to examine system performance.

3 - Lean Manufacturing Simulation for Production Line Balancing in Footwear Manufacturing

Thanakorn Naenna, Department of Industrial Engineering, Mahidol University, Nakhonprathom, Thailand, egtnn@mahidol.ac.th, Paradon Khongsawat

In this research, lean will be applied in footwear manufacturing specific on stitching production line. As the main problem is poor production line efficiency and high inventory amount. Then, to solve problem directly by creating a new line balance, simulation is a tool applied for balancing cycle time under the limitation of take time. Eventually, line balancing has been improved in pilot production line simulation of footwear manufacturing.

■ MC04

S-Ballroom B

Analyzing Flexible Manufacturing Systems

Cluster: Flexible Manufacturing Systems
Invited Session

Chair: Kathryn E. Stecke, Professor, University of Texas, Dallas, School of Management-SM30, 2601 N. Floyd Rd., Richardson, TX, 75080, United States, kstecke@utdallas.edu

1 - Re-entrant Flexible Production Systems Analysis

Young Jae Jang, MIT, 60 Wadsworth St. #17E, Cambridge, MA, 02142, United States, youngjae@mit.edu, Stanley B. Gershwin

We analyze a model of a re-entrant flexible production system with finite buffers and unreliable machines. Semiconductor and LCD fabrication are re-entrant processes, in which a sequence of processing steps is repeated.

We use a decomposition method and describe formulations and algorithms to analyze the behavior of the system.

2 - A New Genetic Algorithmic Method to Solve Cellular Manufacturing Problems

Nirjhar Roy, Professor, M.N. National Instt. of Tech., M.N. National Instt. of Tech., Teliarganj, Allahabad, 211004, India, nroy_39@rediffmail.com, Deepesh Chandra Shukla

This research paper describes a new approach for modeling formation of machine groups and the associated part families using a linguistic model for flexible manufacturing system. The method is based on a hierarchical approach in deciding the number of clusters/ machine groups. The solution is further improved by utilizing a genetic algorithm with the objective of decreasing inter-cell distance moved.

3 - Measurement of Manufacturing Flexibility Using a Fuzzy Theoretic Framework

Rahul Caprihan, Reader in Mechanical Engineering, Dayalbagh Educational Institute, Dayalbagh, Agra, UP, 282005, India, rahul@caprihan.com, Ankur Das

We suggest a fuzzy theoretic framework that utilizes linguistic variables to quantify pertinent factors affecting defined types of manufacturing flexibility. The suggested framework provides an expedient mechanism for the evaluation of the overall manufacturing flexibility for a system by exploiting the inherent vagueness associated with factors needed to define the assumed flexibility types.

■ MC05

S-Ballroom C

RFID and Operational Inefficiencies

Cluster: Supply Chain Models
Invited Session

Chair: Jay Swaminathan, msj@unc.edu

Co-Chair: Ozalp Ozer, Stanford University, 380 Panama Drive, Stanford, CA, 94305, United States, ozalp@stanford.edu

1 - Impact of Inventory Record Inaccuracies due to Execution Errors

Nesim Erkip, Bilkent University,, Dept. of Industrial Engineering,, Ankara, 06800, Turkey, nesim@bilkent.edu.tr, Esma S. Gel

Inventory record inaccuracies have been shown to be ubiquitous in retail companies. We consider inaccuracies due to execution errors and estimate their economic impact. We explicitly model natural correction opportunities and comment on reasonable strategies to minimize sub-optimality.

2 - Inventory Record Inaccuracy and RFID Adoption Incentives in a Supply Chain

Sebastian Heese, hheese@indiana.edu

We study a supply chain with one manufacturer and one retailer, who suffers from inaccurate inventory records. We show that such inaccuracies exacerbate the inefficiencies resulting from double marginalization in the decentralized supply chain. Assuming that RFID technology eliminates the problem of inventory record inaccuracy, we determine the cost thresholds at which RFID adoption becomes profitable and show that RFID adoption improves supply chain coordination.

3 - Value of RFID in Retail Settings

Jay Swaminathan, msj@unc.edu, Jun Zhang

We study the impact of item-based RFID implementation on the performance of supply chain members and identify situations where the implementation of RFID technology creates values for both the retailer and the manufacturer.

4 - The True Value of RFID in Reducing Out of Stock through Inventory Visibility

Ozalp Ozer, Assistant Professor, Stanford University, 380 Panama Mall, Stanford, 94305, United States, ozer@stanford.edu, Aykut Atali, Hau Lee

Inventory shrinkage has shown empirically to create a mismatch between actual and recorded inventory, leading to expensive stockouts. Based on an operating model of a retail store, we quantify the true value of RFID in reducing out of stock through curbing shrinkage and improving the discrepancy between inventory records and actual inventories.

■ MC06

S-Sung I

Retail Operations II

Cluster: Operations Management
Invited Session

Chair: Jan Fransoo, Professor, TU Eindhoven, P.O. Box 513, Pav F4, Eindhoven, NL-5600 MB, Netherlands, J.C.Fransoo@tm.tue.nl

1 - An Empirical Study of Ordering Behavior of Retail Stores

Tom van Woensel, TU Eindhoven, P.O. Box 513, Pav F5, Eindhoven, NL-5600 MB, Netherlands, t.v.woensel@tm.tue.nl, Karel van Donselaar, Rob Broekmeulen, Jan Fransoo, Vishal Gaur

This paper presents an empirical study of the ordering behavior of retail stores in a supermarket chain. Metrics to measure various aspects of ordering behavior are constructed using orders, shipments data, and POS sales data for 19,417 item-store combinations over five stores. Using the defined metrics, the impact of operational and product characteristics is examined. Differences in stores' ordering behavior and from the automated ordering system installed are described and analyzed.

2 - Empirical Results on Drivers of Retail Sales and Customer Satisfaction

Marshall Fisher, UPS Professor, The Wharton School, University of Pennsylvania, Philadelphia, PA, United States, fisher@wharton.upenn.edu, Serguei Netessine, Jayanth Krishnan

We discuss results of analysis conducted with a retailer to understand the drivers of sales and customer satisfaction using data from 500 stores over 29 months. We find that the primary drivers of sales are payroll for store associates, in stock rate and customer satisfaction. This project is part of a larger initiative involving 5 retailers to understand what policies lead to effective in store execution.

3 - Backroom Stocks, Shelf Space and Out-of-stocks: An Empirical Study

Jan Fransoo, Professor, TU Eindhoven, P.O. Box 513, Pav F4, Eindhoven, NL-5600 MB, Netherlands, J.C.Fransoo@tm.tue.nl, Rob van den Pol, Rob Broekmeulen, Karel van Donselaar, Tom van Woensel

An analysis of out of stocks demonstrates that backroom operations are an important cause. We further analyze the causes for the existence of backroom stock and relate this to the concept of Excess Shelf Space, and show a strong relationship between the existence of negative excess shelf space and the existence of backroom inventory. We discuss various ways of using these insights to improve store operations.

■ MC07

S-Sung II

Inside Strategic Marketing Software

Cluster: Practice/Strategic Marketing
Invited Session

Chair: Manoj Chari, manoj.chari@sas.com

1 - Uplift Analysis: Predicting Differential Response to Marketing Actions

Nick Radcliffe, nick.radcliffe@quadstone.com, Mark Smith

It is standard to assess prediction models by comparing outputs to real outcomes. But there are situations where analysts need to fit the difference in outcomes between a population in which there is some intervention and an equivalent population in which there is none. We call this difference the uplift, and will discuss a direct modeling approach with real case studies to predict uplift for individual customers, notwithstanding that the uplift cannot be directly measured for any individual.

2 - Offer Assignment with SAS Marketing Optimization

Manoj Chari, manoj.chari@sas.com

Marketing Optimization addresses the following marketing decision problem: Given a set of marketing offers, what offer(s) should each customer from a set of prospective customers receive, so as to optimize some aggregate measure of value while satisfying relevant business constraints, customer eligibility and contact policy rules. The presentation will demonstrate how SAS Marketing optimization enables the modeling and solution of these decision making problems.

■ MC08

S-Ching

Behavioral Game Theory

Sponsor: Decision Analysis
Sponsored Session

Chair: Rami Zwick, Professor, Hong Kong University of Science and Technology, Clear Water Bay, Kowloon, Hong Kong, mkzwick@ust.hk

1 - A Cognitive-Hierarchy Model of Games

Juin-Kuan Chong, bizcj@nus.edu.sg, Colin Camerer, Teck H. Ho

Players in a game are "in equilibrium" if they are rational, and accurately predict other players' strategies. In many experiments, however, players are not in equilibrium. An alternative is "cognitive hierarchy" (CH) theory, where each player assumes that his strategy is the most sophisticated. The CH model has inductively defined strategic categories: step 0 players randomize; and step k thinkers best-respond, assuming that other players are distributed over step 0 through step k - 1. This model fits empirical data, and explains why equilibrium theory predicts behavior well in some games and poorly in others. An average of 1.5 steps fits data from many games. We also show how the basic model can be extended to study behaviors in dynamic games.

2 - To Reveal or Not To Reveal? Strategic Disclosure of Private Information in Negotiation

Ching Chyi Lee, Chinese University of Hong Kong, Hong Kong, clee@baf.msmail.cuhk.edu.hk, Michael Ferguson

We analyzed a bargaining model and found surprisingly that sometimes it may be beneficial for a bargainer to reveal private information that may lead to disclosure of his reservation value. We tested our model in an experiment and found that subjects' behavior is not entirely consistent with the theoretical predictions. We then propose a history-consistent rationality model (HCR model) to account for players' behavior. Comparison of predictions indicates that the HCR model predicts better.

3 - Batch Queues with Choice of Arrivals: Equilibrium Analysis and Experimental Study

Rami Zwick, Professor, Hong Kong University of Science and Technology, Clear Water Bay, Kowloon, Hong Kong, mkzwick@ust.hk, William E. Stein, Darryl A. Seale, Hongtao Zhang, Amnon Rapoport

We study the decisions agents make in two queueing games with endogenously determined arrivals and batch service. In both games, agents are asked to independently decide when to join a queue to receive bulk service, or they may simply choose not to join it at all. Symmetric mixed-strategy equilibrium solutions are constructed for two games in discrete time where balking is prohibited and where it is allowed. They are then experimentally tested in a study that varies the game type (balking vs. no balking) and information structure (private vs. public information) in a 2'2 between-subject design. With repeated iterations of the stage game, all four experimental conditions result in aggregate, but not individual, behavior approaching mixed-strategy equilibrium play.

■ MC09

S-Ming I

Scheduling Decisions in Supply Chain Management

Cluster: Scheduling
Invited Session

Chair: Xiaoqiang Cai, Department of Systems Engineering and Engineering Management, The Chinese University of Hong Kong, Shatin N. T., Hong Kong, xqcai@se.cuhk.edu.hk

1 - Components Scheduling in a Make-to-Order System with Unreliable Processes

Houcai Shen, Professor, Nanjing University, Department of Management Science, Nanjing, JS, 210093, China, hcshen@nju.edu.cn

We consider components scheduling problem faced in a make-to-order system with unreliable supply processes. After the scheduling model is developed, we present some structural results and develop an efficient algorithm to find the optimal policy which requires a trade-off between starting too early which leads to potential holding cost, and starting too late which leads to potential loss of goodwill.

2 - 3-Tier Integrated Scheduling Algorithms for Supply Chain Management

Tsiushuang Chen, Department of Automation, Nankai University, Tianjin, China, chenqs@nankai.edu.cn, Xin Sun

Supply Chain Management emphasizes on the coordination of the partners. This paper considers the integrated scheduling of 3-tier supply chains to minimize the total delivery cost and improve the customer service. Based on the features of the optimal schedules, a dynamic programming algorithm, and a simulated

annealing algorithm (SA) are proposed. The simulation results are given to show the effectiveness and efficiency of the SA.

3 - Online Scheduling with Hard Deadlines

Guochuan Zhang, Department of Mathematics, Zhejiang University, Hangzhou, 310027, China, zgc@zju.edu.cn, Jihuan Ding

We deal with an online scheduling problem with identical job processing times. Each job is associated with a release time and a deadline, neither of which is known until the job appears. As soon as a job is available, we must immediately decide if the job is accepted or rejected. If accepted, it must be completed by its deadline. The goal is to maximize the total number of jobs accepted. Our main result is an optimal on-line algorithm for the two-machine case.

4 - Product Selection, Machine Time Allocation, and Scheduling Decisions for Manufacturing Perishable Products Subject to a Deadline

Xiaoqiang Cai, Department of Systems Engineering and Engineering Management, The Chinese University of Hong Kong, Shatin N. T., Hong Kong, xqcai@se.cuhk.edu.hk, Y.B. Xiao, X.L. Xu, Jian Chen

A manufacturer owns an amount of perishable material which can be produced into different types of products subject to a deadline. Due to the deadline constraint and the raw material limit, he needs to determine: (i) the product types to be produced; (ii) the machine time to be allocated for each product type; and (iii) the sequence to process the products selected. We derive the optimal policy consisting of the three decisions.

MC10

S-Ming Il

Advances in Integer Programming

Cluster: Mathematical Programming/Optimization
Joint Invited/Sponsored

Chair: Eva Lee, Associate Professor & Director, Center for Operations Research in Medicine, Industrial & Systems Engineering, Georgia Institute of Technology, Atlanta, GA, 30332-0205, United States, evakylee@isye.gatech.edu

1 - Facets of Conflict Hypergraphs - Theory and Computation

Eva Lee, Associate Professor & Director, Center for Operations Research in Medicine, Industrial & Systems Engineering, Georgia Institute of Technology, Atlanta, GA, 30332-0205, United States, evakylee@isye.gatech.edu, Siddhartha Maheshwary

In this talk, we present the construction of conflict hypergraphs from independent set and multi-dimensional knapsack polytopes. Valid and facet-defining inequalities will be identified from the hypergraphical structures. Computational results of these strong valid inequalities on real-world MIP instances will be described.

2 - Relations Between Facets of Cyclic Group Problems and Knapsack Problems

Ellis Johnson, Professor, School of Industrial & Systems Engineering, Georgia Institute of Technology, Atlanta, GA, 30332-0205, United States, ellis.johnson@isye.gatech.edu

The relations between cyclic group and knapsack problems is explored. The knapsack problem considered is general integer: the problem that Gilmore & Gomory studied for column generation. Necessary condition for mappings between facets cyclic group to knapsack is given. It uses Gomory's subadditive characterization of facets for master group problems. Any facet of the knapsack problem is shown to yield a facet of two cyclic group problems and of the knapsack cover.

MC11

S-Boardroom

Environmental Policy Issues

Sponsor: Energy, Natural Resources and the Environment
Sponsored Session

Chair: Ming Lei, Professor, Peking University, Beijing, China, leiming@gsm.pku.edu.cn

1 - Environmental Policy and Data Envelopment Analysis

Isabelle Piot-Lepetit, Research Scientist - Micro Economist, INRA, Economie, 4 allée Adolphe Bobierre, CS 61103, Rennes, Fr, 35011, France, Isabelle.Piot@rennes.inra.fr

The recent development of new distance functions provides a useful framework to implement theoretical models developed to analyze various environmental policy instruments on individual data. This paper highlights the advantages of these functions for simulating regulation and revealing the costs related to environmental protection. These functions recognize the presence of inefficiency

and correct them. They can be used to evaluate static and dynamic expected impacts on decision-making units.

2 - Demonstration Analysis between Urban Infrastructures and GDP

Li Jie, Sichuan University, 236#, Business School, Sichuan University, Chengdu, Si, 610064, China, jijie86086@163.com, Zhang Yu

In recent years, urban infrastructures play an important role in economic development. With correlative analysis and Neural Network, This article analyzes the relationship between various indexes of urban infrastructures and GDP in these cities: Peking, Shanghai, Hong Kong, Guangzhou, Chengdu. Finally, we get some significant conclusions. And then some advice is given.

3 - Applied Analysis of the Regional Green Input-Output Accounting: A Case Study with Ningxia

Ming Lei, Professor, Peking University, Beijing, China, leiming@gsm.pku.edu.cn, Yichao Hu

We establish resource-energy-economy-environment green input-output table of Ningxia in 1992 and 1997 on the basis of the green input-output theory, combining to the input-output table of Ningxia in 1997, the yearbook of Ningxia in 1998 and other related data. We put up primary analysis including compute the corresponding direct use coefficient and the complete use coefficient, and analyze the actual condition of energy resource and environment of Ningxia.

MC12

S-Celestial Court-Jade

Control and Management of Manufacturing Systems

Contributed Session

Chair: Andrew Yao, California State University, Northridge, 512 Woodruff Ave., Arcadia, CA 91007, United States, cyao@csun.edu

1 - Adaptive DeadBand Control for Overlay Control in Semiconductor Photo-Lithography Process

Hoyo-Heon Ko, Korea University, Anam-dong Seongbuk-Gu, Seoul, South Korea, swish17@korea.ac.kr, Ji-Bin Hwang, Sung-Shick Kim

This Research present Overlay Control scheme for Photo-Lithography Process in Semiconductor Manufacturing. We propose the ADC (Adaptive DeadBand Control) for efficient control of Photo-Lithography Process. ADC uses EWMA and ARL base on historical input and output data. The simulation results show that the proposed scheme is robust for drift and white noise case and sensitive to shift. Furthermore, the normalized MSE is greatly reduced compared to existing methods.

2 - One Dimensional Packing Problem in Aluminum Extrusion Process

Jaramporn Hassamontr, Associate Professor, Department of Production Engineering, King Mongkut Institute of Technology, 1518 Pibulsongkram Rd., Bangsue, Bangkok, 10800, Thailand, jaramporn_h@yahoo.com

This paper attempts to minimize material waste generated in aluminum profile extrusion through a modeling approach. First, extrusion process is classified into two types of setups. An optimization scheme is developed for each setup. Then experimental data are used to create density band that can predict aluminum density during the process more precisely. The optimization tools developed are now fully implemented in industry. It has been found that material waste is reduced by as much as 2%.

3 - Simulating an Agile, Synchronized Manufacturing System

Andrew Yao, California State University, Northridge, 512 Woodruff Ave, Arcadia, CA, 91007, United States, cyao@csun.edu, John G. Carlson

High volume, semi-custom upholstered furniture system must embrace & extend objectives of both lean & agile operations plus coordinated & balanced work flow throughout plant. Two+ subassembly lines synchronization requires an On-line/real-time infosystem & visual signals. Status/location of process consigned into lots is essential to be responsiveness, changeovers, schedule revisions & contending with unanticipated changes. Batch size is a dominant factor affecting company's total system.

■ MC13

S-Celestial Court-Pearl

Pricing Information in Supply Chains

Contributed Session

Chair: Dengfeng Zhang, University of Iowa, S210 PBB, Iowa City, IA, 52242, United States, dengfeng-zhang@uiowa.edu

1 - A Genetic Algorithm for Solving Category Pricing Problems

Qiang Song, BlueCube Company, 11795 Ashwick Place, Alpharetta, GA, 30005, United States, qsong3@hotmail.com, Augustine Esobue

Category pricing is important in daily retail operations. The problem is to dynamically determine the price for each brand within a category to maximize the profit of the category. When the prices are discrete values, we have a hard combinatorial optimization problem. Although this problem may be approximated by an integer programming model, the nonlinear nature of the price-demand relation makes it a very hard problem. In this paper a GA is proposed to solve this problem with good results.

2 - A Deterministic Multi-Item System under Joint Pricing and Stock Replenishing Control

Li Luo, SiChuan University, Chengdu, China, lluo@se.cuhk.edu.hk, Youyi Feng

This paper explores the problem of joint pricing and inventory replenishing management for a deterministic multi-item inventory system which faces deterministic demand as a monopolistic retailer. We formulate the problem through a general deterministic dynamic programming approach while pricing and ordering decisions are tied with operating variable costs, including ordering cost and inventory holding/shortage costs. The demand rate of any item is assumed to be a price response function. The objective is to find an optimal pricing and cycle length ordering policy that maximizes the average profit per unit time. We provide an approach of determining when and which price should change during an ordering cycle, how often such changes should be made, and how such changes affect ordering cycle length and quantities.

3 - Optimal Seat Inventory Model in Airlines

Hwi Young Lee, Inha Technical College, 253, Yonghyun-dong Nam-ku, Incheon, 402-752, South Korea, leehy1231@naver.com, Yun Sook Song, Moon-Gil Yoon

This optimal model is analyzed, in realistic environment, the volume of "Accept Demand" and "Reject Demand" through total 400 times' simulation experiments at each fare level by using C-program process applied to diversion and fare-upgrade models of demand. As a consequence, this optimal model indicated that the revenue of the case to consider the both shifts of demand at each fare level is bigger than that of the case to consider the single shift of demand at each fare level, except the case to downsize the seat allocation at very low price when supply is bigger than demand. Therefore, this study is to maximize the revenue at various fare levels, and also to try to generalize and mitigate the assumption made from the other studies

4 - Price Competition in a Consignment Contract Between a Single Retailer and Suppliers

Dengfeng Zhang, University of Iowa, S210 PBB, Iowa City, IA, 52242, United States, dengfeng-zhang@uiowa.edu, Renato de Matta

We consider a supply chain with two suppliers of substitutable products on consignment to a single retailer. The retailer is the Stackelberg leader that sets the revenue sharing, while the suppliers are followers competing on price and sales volume. Using a nonlinear demand function, we develop equilibrium model solutions to investigate how channel decisions and changes in exogenous parameters such as price elasticity affect channel profits.

■ MC14

S-Celestial Court-Coral

Optimization and Oncology

Cluster: Medical Applications

Invited Session

Chair: Allen Holder, Trinity University Mathematics, One Trinity Place, San Antonio, TX, United States, aholder@trinity.edu

1 - Dose Point Resolution and Beam Selection

Allen Holder, Trinity University Mathematics, One Trinity Place, San Antonio, TX, United States, aholder@trinity.edu, Matthias Ehrigott, Daniel Nevin, Bill Salter, Josh Reese

The design of a radiotherapy treatment includes the selection of beam angles, which in practice are manually selected and typically based on the clinician's experience. Solving the beam selection problem optimally is beyond the capability of current optimization algorithms and software. In this talk we compare various heuristic approaches on a clinical case. In particular, we study the influence of dose point resolution on the performance of the selection heuristics.

2 - Multileaf Collimator Field Segmentation without Tongue-and-groove Effect

Thomas Kalinowski, University of Rostock, Universitaetsplatz 1, 18051 Rostock, Rostock, MV, Germany, thomas.kalinowski@uni-rostock.de

We consider the problem of decomposing intensity modulated radiation fields into homogeneous fields that can be delivered by a multileaf collimator. We present an approach, based on a Min—Max theorem, to minimize the total irradiation time taking into account the interleaf collision constraint and tongue-and-groove underdosage effects.

3 - New Algorithms for MLC Sequencing

Davaatseren Baatar, Dr. The University of Melbourne, Department of Mathematics and Statistics, Parkville, Vic 3010, Melbourne, Australia, D.Baatar@ms.unimelb.edu.au, Robert Johnston, Natasha Boland, Horst Hamacher

The multileaf collimator sequencing problem in cancer radiation therapy deals with the decomposition of a positive integer matrix into an integer linear combination of binary matrices which have so-called consecutive ones (C1) property. In this talk we consider the problem of minimizing the number of the binary matrices used in the decomposition, which has been shown to be strongly NP-hard by Baatar et al (2005). New models and heuristic algorithms will be presented.

■ MC15

S-Celestial Court-Amber

Advanced Manufacturing Control Research in Japan

Cluster: Special Sessions

Invited Session

Chair: Kazuo Miyashita, National Institute of Advanced Industrial Science and Technology (AIST), 1-2-1 Namiki, Tsukuba, Ibaraki, 305-8564, Japan, k.miyashita@aist.go.jp

1 - Advance WIP Management and Control in Semiconductor Manufacturing

Tsukasa Okazaki, Hitachi East Japan Solutions, Ltd., Sendai, Miyagi, 980-0014, Japan, okazaki@hitachi-to.co.jp, Kazuo Miyashita, Hirofumi Matsuo

We develop a hierarchical distributed production planning and control methodology, called DISCS, for large and unstable semiconductor manufacturing processes. DISCS optimizes the work-in-process inventory level and controls job sequence at each workstation to meet demand. Computational experiments using wafer fabrication process data show that DISCS meets the demand and keeps lower WIP levels as compared with conventional control methods.

2 - Multiagent based Production Control to Prevent Capacity Loss During Failures

Rajesh Gautam, University of Tsukuba, Tsukuba, Ibaraki, 305-8564, Japan, r.gautam@aist.go.jp, Kazuo Miyashita

Output in high-volume production facilities is limited by the bottleneck machines. We propose a control mechanism by modeling workstations as agents that pull jobs based on their current WIP level and requirements from other agents. During the failure where the flow of some kind of jobs is disrupted, the agents pull alternative jobs to keep utilization of their capacity at a high level. We show that the proposed mechanism can react to the failures more appropriately than other control mechanism

3 - Two-stage Flow Shop Scheduling Problem with Critical Machine

Hiroshi Morita, Professor, Osaka University, Graduate school of Information Science and Technology, 2-1 Yamadaoka, Suita, 5650871, Japan, morita@ist.osaka-u.ac.jp, Motohiko Sasaki

This paper develops an effective algorithms to solve the two-stage flow shop makespan problems with critical machine assuming that all jobs that require processing on the same subset of machines are contiguously processed.

■ MC16

S-Celestial Court-Amethyst

E-Learning

Contributed Session

Chair: Dorothy Fisher, Professor, California State University, Dominguez Hills, 1000 E. Victoria St, Department of IS & OM, Carson, CA, 90747, United States, dfisher@csudh.edu

1 - Project Management Methodology and Model for an E-learning Implementation

John Ruero, Dean, College of Computer Studies, Lyceum of the Philippines, Real cor. Muralla Sts., Intramuros, Manila, Philippines, john.ruero@gmail.com

The e-Learning Implementation Project is a project that targets the very core-competency of the academic institution, which is instructional delivery. Implementing an e-Learning project requires understanding of each institution's cultural, organizational (political), pedagogical, financial and infrastructural plans in order to succeed in the project. The paper presents a Project Management Methodology and Model and how it can be effectively utilized in an e-Learning Project Implementation.

2 - A Bidirectional Conceptual Map Model for Developing E-Learning Evaluation System

Chih-Hui Huang, Chaoyang University of Technology, 168 Jifong E. Rd., Wufong Township, Taichung, Taiwan, s9367601@mail.cyut.edu.tw, Chin-Ling Lee, Cheng-Jian Lin

We proposed an E-learning evaluation system to produce optimal combination of test items which fit to the bidirectional concept in learning with adaptive difficulty. Our proposed utilized the characteristics of optimal genetic algorithm based on the test-sheet generation model. Simulation results showed that the proposed method could produce the optimal test combination that fit the learning goal, which helps the learner to overcome the learning obstacle and improve the learning effectiveness.

3 - A GMI Model for Developing Personalized E-Learning System

Shih-Chieh Su, Chaoyang University of Technology, 168 Jifong E. Rd., Wufong Township, Taichung, Taiwan, twsam@yahoo.com.tw, Chin-Ling Lee, Cheng-Jian Lin

Based on the General Model of Instruction (GMI), this study is to establish an individual/personal instruction system by applying the grey theory and Item Response Theory (IRT). The system can evaluate the learner's ability then provide the learner with learning materials suitable for adoptive learning to meet the needs of the individual learner and to solve the problems of learner control, disorientation and cognitive overload.

4 - The Impacts of Communication Structure and Conflict on Learning Performance and Satisfaction in the CMC

Rong-Long Hsu, Doctoral Student, National Central University, #300 Jung-Da Rd, Jung-Li, 32054, Taiwan, srl@icemail.nknu.edu.tw, Huey-Wen Chou

The development of new communication technologies and their applications has opened a broad spectrum of options to promote learning, of which a significant one is Computer-Mediated Communication. However, the overdependence on IT-mediated learning process may result in cognitive overloads that are harmful to learning effectiveness. In the present study, the relationship among communication structure, team conflict, and communication satisfaction in the CMC context will be explored.

5 - Web Accessibility in Information Systems Curriculum

Dorothy Fisher, Professor, California State University, Dominguez Hills, 1000 E. Victoria St, Department of IS & OM, Carson, CA, 90747, United States, dfisher@csudh.edu, Mohammad Eyadat

A majority of web sites remain inaccessible to people with disabilities. This study proposes a "Web Accessibility Curriculum Model" that identifies where in the web development process to incorporate web usability and accessibility and how to use the available tools to assist web developers to test web accessibility.

■ MC17

H-Crystal Room 1

SCP Applications in Industry

Cluster: Supply Chain Planning & Advanced Planning Systems
Invited Session

Chair: Hans-Otto Guenther, Professor Dr., TU Berlin, Dept. of Production Management, Wilmersdorfer Str. 148, Berlin, 10585, Germany, Hans-Otto.Guenther@tu-berlin.de

1 - Supply Network Design in Chemical Industry: Production Network Optimization in Specialty Chemicals

Reinhard Huebner, TU Berlin, Wilmersdorfer Str. 148, Berlin, 10585, Germany, Reinhard_Huebner@mckinsey.com, Hans-Otto Guenther

Global specialty chemicals companies operate extensive production networks created both via organic growth and M&A activities. Recently, increased competition and changes in geographical demand distribution have intensified the need for strategic network optimization. A sequential optimization process based on a MILP model that accounts for particularities of specialty chemicals production and global production networks is proposed. Applicability is demonstrated with an example from industry.

2 - Sales and Supply Planning with Price Uncertainty of Commodities in the Chemical Industry

Hans-Otto Guenther, Professor, Dr., TU Berlin, Dept. of Production Management, Wilmersdorfer Str. 148, Berlin, 10585, Germany, Hans-Otto.Guenther@tu-berlin.de, Matthias Kannegiesser, Paul van Beek, Christoph Habla, Martin Grunow

We present a planning model for chemical commodities related to an industry case. Contract and spot demand differentiation with volatile and uncertain spot prices, sales quantity flexibility, price-quantity functions and variable raw material consumption rates are problem specifics. The model optimizes profit synchronizing sales quantity, price and supply decisions. A two-phase optimization approach supports robust planning based on price scenarios.

3 - SCM in Chemical Industry: Collaborative Planning of Production and Distribution in Supply Networks

Markus Meiler, TU Berlin, Dept. of Production Management, Wilmersdorfer Str. 148, Berlin, 10585, Germany, Markus.Meiler@TU-Berlin.DE, Hans-Otto Guenther, Martin Grunow

A key issue for production planning in chemical industry is the co-ordination of plant operations in various sites of a multi-national supply network. We present a hierarchical modelling approach for collaborative supply network planning, based on hybrid optimization methods. With the help of various aggregation techniques adjusted to the special requirements of the chemical industry, it is possible to obtain a compact model formulation whose applicability can be shown by examples from industry.

4 - Hierarchical Supply Chain Management for Raw Sugar Production

Martin Grunow, Dr., Technical University of Denmark, Department of Manufacturing Engineering and Management Produktionstorvet, Building 423 2800, Kgs. Lyngby, Denmark, grunow@ipl.dtu.dk, Hans-Otto Guenther, Rafael Westinner

Based on a case study from Venezuela, the supply chain for the production of raw sugar is investigated. The developed approach aims at preserving a constant supply while minimizing the associated costs. The entire planning problem is decomposed into three decision levels, (1) cultivation of the haciendas, (2) harvesting, and (3) dispatching of the harvesting machinery and crews. The corresponding optimization models and solution procedures are introduced and their application is demonstrated.

■ MC18

H-Crystal Room 2

Maritime Logistics

Cluster: Shipping, Transport and Supply Chain Logistics
Invited Session

Chair: Kevin Li, Dr, The Hong Kong Polytechnic University, Hung Hom, Kowloon, Hong Kong, Hong Kong, China, Lgtkxli@polyu.edu.hk

1 - Electronic Shipping Documents

Patrick Donner, Associate Professor, World Maritime University, P.O. Box 500, Malmö, 201 24, Sweden, Patrick.Donner@wmu.se

Electronic documentation can save time and costs in international transactions. However, there are still legal obstacles regarding electronic Bills of Lading. The UNCITRAL Draft Instrument on Carriage of Goods [wholly or partly] [by Sea] may, sometime in the future, bring viable electronic equivalents to Bills of Lading, but international trade and the shipping industry need to, and can, find short-term solutions by adapting and modernising existing trading and documentation practices.

2 - Chinese Shipping Development from a Logistics Perspective

Jiaqi Yang, Professor, Deputy Dean, School of Transportation, Wuhan University of Technology, Heping Avenue 1040, Wuchang Yujiatou, Wuhan, HB, 430063, China, jackyyoung@126.com

This paper analyzes the present situation of Chinese logistics and shipping market from a perspective of the structural features of the demand and supply for logistics services, and defines the role and position of Chinese shipping industry in the changing logistics market in the light of the logistical characteristics (advantages and disadvantages) of shipping lines and the circumstances (political and technical) faced by Chinese shipping firms.

3 - The Research on Traffic Simulation at Sea

Meilong Le, Professor, Shanghai Jiao Tong University,
1954 Huashan Rd., Shanghai, Shanghai, SH, 200030, China,
mle@sytu.edu.cn

The simulation in this paper is dynamic mass simulation. Because a large quantity of data should be processed, various simplified method is used in organizing environment data. Vessels are generated according to certain distribution, and then move along the routes. When one vessel moves along the route and meets some abnormal situation through detecting nearby vessels, it will adopt certain measures automatically according to the model. So the influence of traffic turbulence can be simulated. All the data is recorded while simulating.

4 - Marine Traffic Risk Analysis - Application of Dynamic Simulation to the Navigation Channel Design

T. L. Yip, Lecturer, The Hong Kong Polytechnic University,
Department of Logistics, The Hong Kong Polytechnic University,
Kowloon, Hong Kong, lgtly@polyu.edu.hk, Richard D. Colwill

This paper describes an investigation into marine traffic safety using dynamic marine traffic simulation, firmly established as a tool capable of assisting stakeholders with the prediction of impacts of planned port and coastal developments. An investigation on triangular estuaries with uniform traffic arrivals is presented to illustrate the sensitivity of marine risk to variations in the placement and number of navigation channels.

MC19

H-Crystal Room 3

Decision Support Technology

Cluster: Information Systems and Electronic Commerce
Invited Session

Chair: Shin-Yuan Hung, Associate Professor, National Chung Cheng University, 168, University Road, Minhsiaung, Chia-Yi, TW, Taiwan, syhung@mis.ccu.edu.tw

1 - Developing Mobile-based Product Recommending Decision Support Systems for Direct Selling Industry

Ching-Chang Lee, Associate Professor, National Kaohsiung First University of Science & Technology, 2, Juoyue Rd., Nantz District, Kaohsiung, Taiwan, clee@ccms.nkfust.edu.tw, Jau-Ling Huang

Due to the development of mobile technologies has become mature, mobile commerce is considered as the next important application of information technologies in business. In this paper, we construct a framework which uses mobile devices and data mining techniques to find suitable customers and products for direct selling agents. The research results can help direct selling industry in adopting mobile commerce and decision support technologies.

2 - The Role of Individual Computer Characteristics in the Information Retrieval of EIS

Kang Tsan-Ching, National Chung Cheng University,
168, University Rd., Min-Hsiung, Chia-Yi, 621, Taiwan,
zanching@mail2000.com.tw, Hung Shin-Yuan, Chang Li-Min,
Chang Yu-Chin

Vandenbosch and Huff (1997) developed an information retrieval model to understand the behavior of executive information system (EIS) use. This study extends information retrieval model to discuss the role of individual computer characteristics. A survey is also conducted to empirically test the model.

3 - Evaluating the Impact of Decisional Guidance on Individual Strategy Selection

Chia-Ming Chang, Ta-Tung Institute of Commerce and
Technology, 1F No 39 Lane 345 Wu-Fen S. Road, Chia-Yi, CY,
600, Taiwan, chiaming@mis.ccu.edu.tw, Hung Shin-Yuan

Decisional guidance researchers have long debated which type of decisional guidance can improve decision support system (DSS) user's decision performance. Decision strategy selection represents distinct cognitive appraisal processes to cope with decision difficulties individual faces. A laboratory experiment is designed to provide theoretical and practical contributions of decisional guidance design.

MC20

H-Jade Suite 1

Dynamic Programming

Contributed Session

Chair: Bowon Kim, Professor, KAIST Graduate School of Management,
207-43 Cheongryangri Dongdaemoon-Ku, Seoul, 130-722, South
Korea, bwkim@kgs.kaist.ac.kr

1 - Nonconvex Variational Problem with Recursive Integral Functionals in Sobolev Spaces: Existence and Representation

Nobusumi Sagara, Professor, Faculty of Economics,
Hosei University, 4342, Aihara, Machida, Tokyo, 194-0298, Japan,
nsagara@mt.tama.hosei.ac.jp

The purpose of this paper is twofold. First, we present the existence theorem of an optimal trajectory in a nonconvex variational problem with recursive integral functionals by employing the norm-topology of a weighted Sobolev space. We show the continuity of the integral functional and the compactness of the set of admissible trajectories. Second, we show that a recursive integrand is represented by a normal integrand under the conditions guaranteeing the existence of optimal trajectories. We also demonstrate that if the recursive integrand satisfies the convexity conditions, then the normal integrand is a convex function. These results are achieved by the application of the representation theorem in L^p -spaces.

2 - Stabilization Analysis for a Class of Fuzzy Switched Systems

Chih-Chieh Wang, Juing-Shian Chiou

In this paper, in view of the state-driven switching method, the sufficient stability conditions will be derived for the fuzzy switched systems. This method can be applied to all individual subsystems are unstable. Finally, one example is exploited to illustrate the proposed schemes.

3 - The Study of Weapon Equipment Systems Optimization

Chen Hao-Guang, Professor, The Academy of Equipment
Command & Technology, 3380 Post 172#, Beijing, Beijing,
101416, China, zzy_chg@163.com, Guo Xiao-Tong

The first, the integrating operational effectiveness of weapon equipment systems (IOEWES) is proposed. The second, the Lanchester's equations (LE) applied in weapon equipment systems countermeasure (WESC) is set up. The third, the multi-phases optimization model for WES optimization is given and the intelligent algorithms to solve this model is discussed. At last, several strategies about the WES development are analyzed, and WES development ideas are proposed.

4 - Solving Finite Horizon Markov Decision Processes via Recursive Learning Automata

Hyeong-Soo Chang, Assistant Professor, Sogang University,
Mapo-Gu Sinsoo-Dong 1, Seoul, 121-742, South Korea,
hschang@sogang.ac.kr, Michael Fu, Steven Marcus

A sampling algorithm, called "Recursive Automata Sampling Algorithm (RASA)," that breaks the curse of dimensionality in solving finite horizon Markov decision processes with large state spaces is presented. The finite-time behavior of RASA is also presented.

5 - Optimal Pricing and Spare Parts Manufacturing Strategy for EOL (end-of-life) Services

Bowon Kim, Professor, KAIST Graduate School of Management,
207-43 Cheongryangri Dongdaemoon-Ku, Seoul, 130-722,
South Korea, bwkim@kgs.kaist.ac.kr

Developing a two-stage optimal control theory model, we study the firm strategy to price its products and plan spare parts manufacturing so as to maximize its profit and to fulfill its commitment to providing the customers with the parts continuously over the relevant decision horizon, the production plus warranty period.

MC21

H-Jade Suite 2

Risk Management: Theory and Empirics

Contributed Session

Chair: Shuhong Fang, Associate Professor/Deputy Chairman of Dept.
Finance, Fudan University, Handan Road 220, Shanghai, 200433,
China, shfang@fudan.edu.cn

1 - The Credit-Risk Warning System of Financial Distress in Taiwan

Shu-Ling Lin, Associate Professor, Fu-Jen Catholic University, 510
Chungchen Rd., Hsinchuang, Taipei Hs, Taipei, 242, Taiwan,
trad1008@mails.fju.edu.tw, Ya-Ting Chang

This study measures the possibility of credit risk during the period of 1997 to 2005 in Taiwan. Empirical results show that by using factor analysis and Logit model to extract the contents, they include short-term liquidity, operational efficiency, asset and equity effectiveness, profitability, cash flow, operational growth, solvency and profit growth. The accuracy ratio of classification for the full sampling is 95.58%, high-tech industry 97.50%, traditional industry 94.64% respectively.

2 - Short Selling And It's Impact On Indian Capital Market

Hiren Maniar, Lecturer In Mechanical Engineering, S.S Engineering College, Plot No.85, Hariom Nagar, Near Bortalav, Near Bank Colony, Bhavnagar, GU, 364003, India, hm_maniar@rediffmail.com

Short selling is basically a professional activity having a less participant by Retailers because of too much complexity in short selling. It is used by market makers and intermediaries to facilitate or hedge customer business; by hedge fund managers to establish principal positions as part of their investment strategies; and by investment banks, funds or individual market players wishing to take a view on the direction of a particular security or market. A short sale can be a complex and costly transaction, involving borrowing of securities in order to meet delivery obligations. In volatile market conditions in particular, it can also involve considerable risk to the seller if the market moves the wrong way.

3 - The Risk Management for Technology Credit Guarantee Fund

Hye Jin Jeon, Yonsei University, 134 Shinchon-dong, Seodaemun-gu, Seoul, South Korea, hjjeon@yonsei.ac.kr, So Young Sohn

Generally the performance of technology credit guarantee has been evaluated focusing on the PD on the fund recipient companies. In this paper, we calculate the expected loss model using the PD, EAD and LGD for the Technology Credit Guarantee Fund. When estimating the PD for various types of default, we use the competing risk model. It is expected that our study can contribute to provide the efficient credit risk management for TCGF and the lending institution.

4 - Arbitrage Porftfolio Frontier under Some Trading Limitations

Shuhong Fang, Associate Professor/Deputy Chairman of Dept. Finance, Fudan University, Handan Road 220, Shanghai, 200433, China, shfang@fudan.edu.cn

Arbitrage portfolios, also known as self-financing portfolios, arise extensively in the theory and practice of finance. In this paper, the author discuss the optimal arbitrage portfolios when som trading limitations, such us short-selling for some assets, trading costs and so on. Comparison to the usual portfolio frontier will be presented.

Monday, 3:30pm - 5:00pm

MD01

S-Tang II

Statistical Methods for Quality Improvement: Applications and Theories

Cluster: Quality, Statistics and Reliability - Joint Invited/Sponsored

Chair: Lianjie Shu, Faculty of Business Administration, University of Macau, Macau, Macau, LJShu@umac.mo

Co-Chair: Liwei Bai, danielblw@gmail.com

1 - Improving Sequential Processes in Production, A Case Study using Partition Experimental Designs

Leonard Perry, Assistant Professor, University of San Diego, 5998 Alcalá Park, Engineering Dept., San Diego, CA, 92101, United States, laperry@sandiego.edu

Statistically designed experiments provide a systematic approach to study and analyze the effects of multiple factors on process performance. The partition design provides an investigator a design to model a process that contains multiple steps where measuring the quality characteristic of the first step may not be achievable. This paper presents the application of partition designs at a biotech company and compares the results to traditional designs.

2 - Adaptive CUSUM Procedures with Markovian Mean Estimation

Lianjie Shu, Faculty of Business Administration, University of Macau, Macau, Macau, LJShu@umac.mo, Wei Jiang

This paper proposes using a Markovian-type mean estimating procedure in the conventional cumulative sum (CUSUM) control scheme to update its reference value in an adaptive way. This generalizes a class of Markovian adaptive CUSUM (ACUSUM) schemes to achieve the aim of providing an overall good performance over a range of future expected but unknown mean shifts. A comparison of run length performance of the proposed ACUSUM scheme and other control charts is shown favorable to the former.

3 - A Model for Predicting Human Reliability under Workload

Eui Park, North Carolina A&T State University, 419 McNair Hall, 1601 E. Market Street, Greensboro, NC, 27411, United States, park@ncat.edu, Celestine Ntuen

Human performance substantially influences the reliability and safety level of complex technical systems. For this reason, human reliability analysis constitutes an important part of probabilistic risk analysis. Most researchers view cognitive or human reliability as a composite subjective measure of the operator's perception of how task difficulty compromises performance. We propose a new approach to human reliability modeling with workload and skill performance as major parameters.

4 - A New EWMA Control Chart and Its Comparison with SEWMA and MEWMA Schemes

Shujin Wu, East Normal University, Dept. of Stat., East China Normal Univ., ShangHai, 200062, China, sj_wu@163.com

A new one-sided EWMA chart (NEWMA) for rapid detection of upward or downward changes in the process mean is introduced. Then some theoretical results are obtained on the average run length of NEWMA, SEWMA and MEWMA charts as control limit $\rightarrow +\infty$. At last, numerical comparisons on average run length between NEWMA, SEWMA and MEWMA statistic in detecting unknown mean shifts are presented.

MD02

S-Tang I

Quantitative Management and Decision Analysis Under Changing Environment

Cluster: Fuzzy Sets and Systems

Invited Session

Chair: Chian-Son Yu, Professor, Shih Chien University, #70, DaZhi Street, Taipei, TA, Taiwan, csyu@mail.usc.edu.tw

1 - Automatically Finding a Most Acceptable GDM Solution by a Fuzzy GP-AHP GDM Algorithm

Chian-Son Yu, Professor, Shih Chien University, #70, DaZhi Street, Taipei, TA, Taiwan, csyu@mail.usc.edu.tw

This investigation initially apply the fuzzy AHP framework to build a fuzzy AHP-based GDM mathematical model. By integrating goal programming (GP), analytic hierarchy process (AHP) and fuzzy set theory into a same decision framework, a GP-AHP GDM model is developed in the second step. In the third step, by introducing an influence weight matrix capable of directing/evolving each decision maker's opinion to the group consensus, a fuzzy GP-AHP GDM algorithm is presented.

2 - Solving Nonlinear Programming Problems by Piecewise Linearization Techniques

Mei-Yu Tsai, Natonal Taipei University of Technology, No. 1, Sec. 3, Chung-Hsiao E. Road, Taipei, Taiwan, s4488028@ntut.edu.tw, Jung-Fa Tsai

Although various NLP techniques have been proposed, they can only find a local optimum of a NLP mostly. This study proposes a new linearization method to treat NLPs for finding an approximately global solution. Comparing with the traditional approaches, the proposed method uses less number of 0-1 variables and constraints on the solution process, thereby enhancing the computational efficiency. Numerical examples are also presented to illustrate the usefulness of the proposed method.

3 - A Design of Global Optimization System

Sheng-Yuan Chuang, National Taipei University of Technology, Taipei 10608, Taiwan, s4488043@ntut.edu.tw, Jung-Fa Tsai

This study proposes a global optimizer capable of deriving the global optimum of a nonlinear programming (NLP) problem. The developed system firstly converts the NLP into a convex program by convexification strategies. Then, the approximately global optimum is obtained by using the piecewise linearization techniques iteratively. Illustrative examples also show that the developed optimizer can solve NLPs to obtain global solutions effectively.

4 - Clustering Alternatives Visually Based on the Fuzzy Discriminant Analysis and Decision Balls

Han-Lin Li, Chair Professor, National Chiao Tung University, 1001 Ta-Hsueh Rd, Hsinchu, 300, Taiwan, hlli@cc.nctu.edu.tw, Li-Ching Ma

Discriminant Analysis (DA) is a popular method to classify and predict alternatives into different groups. However, conventional DA method cannot represent the Fuzzy nature of classification, and the decision makers cannot visualize the relationships among alternatives. This study incorporates the concept of Fuzzy sets into DA and proposes a decision ball model to visualize the classification results. The decision maker can also observe the ranks of and similarities among alternatives.

MD03

S-Ballroom A

Simulation for Inventory & Risk Analysis

Sponsor: Simulation

Sponsored Session

Chair: David Muñoz, Professor, ITAM, Rio Hondo # 1, Colonia Tizapan San Angel, Mexico City, DF, 01000, Mexico, davidm@itam.mx

1 - Incorporating Forecasts and Historical Data in Simulation Experiments

David Muñoz, Professor, ITAM, Rio Hondo # 1, Colonia Tizapan San Angel, Mexico City, DF, 01000, Mexico, davidm@itam.mx

We propose methodologies for estimating different performance measurements in simulation experiments with the objective of incorporating historical data and forecasts for a parameter of an input distribution. Performance measurements are proposed according to the available information and appropriate consistent-estimation methodologies are developed. Properties of these methodologies are illustrated through analytical results and simulation experiments using an inventory model.

2 - A Comparative Study of Simulation Optimization Techniques Applied on Inventory Systems

Filip Van Utterbeeck, Royal Military Academy, Renaissancelaan 30, Brussels, 1000, Belgium, filip.van.utterbeeck@rma.ac.be, Dirk Van Oudheusden

We will present and compare the performances of several heuristic procedures (based on Guided Local Search, Tabu Search, Simulated Annealing and Memetic Algorithms) for the optimization of stochastic discrete-event computer simulation models of inventory systems with resupply flexibility.

3 - A Risk Analysis and Decision Model for Engineering Project Using Stochastic Network Simulation

Heung Suk Hwang, Professor, Kainan University, No.1 Kainan Rd, Taoyuan, 338,, Taoyuan, Taiwan, hshwang@mail.knu.edu.tw

This paper is concerned with development of web-based risk evaluation and decision model for engineering project. Major technologies used for this study are AHP (analytic hierarchy process, fuzzy-AHP, multi-attribute analysis, stochastic network simulation, and web-based decision support system. Finally, we have developed computer programs and have shown the results of sample runs for an engineering project risk analysis.

MD04

S-Ballroom B

Scheduling Issues in Flexible Manufacturing Systems

Cluster: Flexible Manufacturing Systems

Invited Session

Chair: Rahul Caprihan, Reader in Mechanical Engineering, Dayalbagh Educational Institute, Dayalbagh, Agra, UP, 282005, India, rahul@caprihan.com

1 - Approximate Algorithms for Parallel Machine Scheduling with Time Deteriorating Job Values

Sumit Raut, Research Scholar, Indian Institute of Technology, E1-317, Hall-4, IIT Kanpur, Kanpur, UP, 208016, India, rsumit@iitk.ac.in, Sanjeev Swami

This paper considers the problem of scheduling n jobs on identical parallel machines where the job value deteriorates with its starting time. We consider three types of job deterioration functions, namely, linear, truncated linear, and exponential. We provide the approximate algorithm to solve the problem with constant worst-case bound ratio. Keywords: Scheduling; Deteriorating job values; Approximate Algorithms; Polynomial Time Approximate Schemes

2 - Flexible Machining in an Integrated System

Sheo G. Misra, Consultant, Misra Associates, 5 Catalpa Street, Morgantown, WV, 26505-3677, United States, misra@icdi.wvu.edu

Flexible machining offers productivity, affordability, and enhanced quality. Massive modernization efforts can yield little net result in productivity improvement and cost reduction without adequate consideration of the specific application. Integrated systems offer the greatest potential and productivity improvement, yet this benefit must be designed into flexible manufacturing systems (FMS) application to ensure success. This paper describes an approach to the successful application of FMS capabilities.

3 - A Fuzzy Dispatching Strategy for FMSs with Information Delays

Rahul Caprihan, Reader in Mechanical Engineering, Dayalbagh Educational Institute, Dayalbagh, Agra, UP, 282005, India, rahul@caprihan.com, Ashok Kumar, Kathryn E. Steckle

We devise a fuzzy dispatching strategy (FDS) for deployment within FMSs with information delays. Relevant system based parameters are fuzzified and an appropriate rule base designed. Simulation experiments demonstrate the superiority of FDS over the WINQ dispatching strategy using the mean tardiness and mean flowtime performance measures.

MD05

S-Ballroom C

Joint Session Supply Chains/ Stochastic Models: Modeling and Optimization of Supply Chains

Cluster: Supply Chains

Invited Session

Chair: Xiuli Chao, Professor, North Carolina State University, Dept. of IE, Raleigh, NC, 27695, United States, xchao@unity.ncsu.edu

1 - Dynamic Pricing and Production Planning of Stochastic Assemble-to-Order System

Houcai Shen, Professor, Nanjing University, Department of Management Science, Nanjing, JS, 210093, China, hcshen@nju.edu.cn, Zhan Pang, Xun Li

We consider an Assemble-to-Order system which consists of two or more components, a single end-product. Different components are produced on separated facilities, demand is price sensitive and the arrivals are modelled by a Poisson process with changeable arrival rate dependent on the price. The main issue is how to dynamically adjust the production rate and the sale price to maximize the long-run totally discounted profit.

2 - Replenishment Sequencing in a Supply Chain with Balanced Ordering

Sheng Hao Zhang, Visiting Scholar, Department of Industrial Engineering and Logistics Management, The Hong Kong University of Science and Technology, Clear Water Bay, Kowloon, Hong Kong., shzhang@ust.hk, Ki Ling Cheung

We study a supply chain with one supplier and multiple heterogeneous retailers. We consider the supplier's optimal cost, optimal stocking level, and implied service level under different retailer replenishment sequences. Our numerical study shows the significant impact of the sequencing decision and reveals that the optimal sequences of the supplier and the retailers are in general not the same.

3 - Wholesale Price Discount Based on Early Order Commitment Periods in a Two-Level Supply Chain

Jinxing Xie, Professor, Tsinghua University, Dept. of Mathematical Sciences, Beijing, 100084, China, jxie@math.tsinghua.edu.cn, Xiande Zhao, Jerry Wei

Early order commitment is one of the strategies for supply chain coordination. In this paper, a game model is used to investigate how the supplier can use wholesale price discount to induce the retailer to practice early order commitment when the retailer's cost information is unknown to the supplier. This model can be used for the supplier to determine the optimal wholesale price discount and for the retailer to determine the optimal early order commitment periods.

4 - Optimal Inventory Policy for Products With Components Subjected to Exponential Breakdowns.

Wee Meng Yeo, Research Officer, Singapore Institute of Manufacturing Technology, 71 Nanyang Drive, Singapore 638075, SG, 638075. wmyeo@SIMTech.a-star.edu.sg, Xue-Ming Yuan

This working paper discusses the optimal policy for a periodic review inventory system with two-component products under non-renewable warranty agreement. Customer demands for products are i.i.d with a common general distribution. Components are subjected to failure with exponential distributions once products are sold. The objective of this work is to decide the optimal inventory level of the product and components so that the total operational cost is minimized.

■ MD06

S-Sung I

Modeling Customers in Operations

Cluster: Operations Management

Invited Session

Chair: Evrim Didem Gunes, Assistant Professor, Koç University, Rumeli Feneri Yolu, Istanbul, 34450, Turkey, egunes@ku.edu.tr

1 - Customer Value Optimizing Marketing Decisions with Reacting Customers

Lerzan Ormeci, Koc University, Dept. of Ind. Eng. Koc University, Istanbul, 34, 34450, Turkey, lormeci@ku.edu.tr, Evrim Didem Gunes, Hazal Ozden, Zeynep Aksin

Our main focus is on the implications of cross-selling in terms of customer reactions and therefore on customer lifetime value to the firm. Under specific assumptions that the cross-sell attempts affect a customer's arrival rate, churn/attrition rate and his/her likelihood to accept the offer provided by the company, we characterize how an optimal policy on whether to cross-sell or not to at each customer encounter changes. For this purpose, we use a Markov decision process framework.

2 - Optimal Dynamic Pricing for Online Travel Firms

Yalcin Akcay, Assistant Professor, Koc University, Turkey, yakcay@ku.edu.tr, Hari Natarajan

We study a pricing problem facing an Internet intermediary that sells opaque travel products from multiple suppliers. We examine the optimal pricing strategy for the firm, over the lifetime of the product, using a dynamic programming model that directly incorporates customer choice behaviour and the perishability of the inventory.

3 - Empirical Validation and Comparison of Pareto/NBD and BG/NBD Models Using Grocery Retailer Data

Meltem Denizel, Associate Professor, Sabanci University, Orhanli Tuzla, Istanbul, 34956, Turkey, denizel@sabanciuniv.edu, Emine Batislam, Alpaz Filiztekin

Benefits of retaining customers lead companies search for means to profile their customers individually and track their retention and defection behaviors. Main issues addressed in customer base analysis are identification of customer status and prediction of future purchase levels. We compare the predictive performance of two models from the customer base analysis literature, in terms of repeat purchase levels, active status, and customer lifetime, using grocery retail transaction data.

4 - Retail Promotions Forecasting: Preventing Out-of-stocks

Tom van Woensel, TU Eindhoven, P.O. Box 513, Pav F5, Eindhoven, NL-5600 MB, Netherlands, t.v.woensel@tm.tue.nl, Karel van Donselaar

It is observed that customers face for promotional products high out of stock situations. This paper demonstrates a promotions forecasting model using empirical data on all promotions from a year past data. Based on this data we generated new forecasts and compared them to the realized forecasts. Finally, allocation decision- and inventory control rules are developed.

■ MD08

S-Ching

Decision Making in Marketing

Sponsor: Decision Analysis

Sponsored Session

Chair: Jianmin Jia, Professor, Chinese University of Hong Kong, Dept. of Marketing, Hong Kong, NT, China, jjia@cuhk.edu.hk

1 - Reference Point Model of Consumer Preference

Rakesh Sarin, Paine Professor of Management, Anderson School of Management at UCLA, 110 Westwood Plaza, Box 951481, Los Angeles, CA, 90095-1481, United States, rakesh.sarin@anderson.ucla.edu

In this presentation, I will discuss a reference point model of consumer preference. The model will be compared with the utility based models such as conjoint measurement. The model can accommodate compromise effect and some other effects noted in the empirical literature.

2 - Preference Reversals and Compromised Effects under Different Task Characteristics

Ya-Chung Sun, Lecturer, Vanung University, No. 1 Van-Nung Rd., Chung-Li, TW, 32045, Taiwan, elic5502@vnu.edu.tw, Shih-Chia Wu, Yueh-Chiang Lee

This research was examined the impacts of different task characteristics on preference reversals including time pressure, framing effects, and information presentation formats. We found that those task characteristics not only influence consumers' preferences but also replace marketing strategies to make consumers

a compromised alternative on different preference levels. Implication of the results of different task characteristics for preference reversals and compromised effects are discussed.

3 - Reflection Effect on the Evaluation of Service Quality

Jianmin Jia, Professor, Chinese University of Hong Kong, Hong Kong, China, jjia@cuhk.edu.hk, Chongyan Gao

This paper investigates the effect of uncertainty on service quality evaluation based on customer satisfaction surveys. We find a "reflection effect" that people are averse to uncertainty in the positive domain of customer satisfaction ratings and favor uncertainty in the negative domain (dissatisfaction). There is also an asymmetric effect such that the managers' evaluation of service quality is more sensitive to customer dissatisfaction than customer satisfaction.

■ MD09

S-Ming I

Sports Scheduling

Cluster: Scheduling

Invited Session

Chair: Ryuhei Miyashiro, Institute of Symbiotic Science and Technology, Tokyo University of Agriculture and Technology, Koganei, Tokyo, Japan, r-miya@cc.tuat.ac.jp

Co-Chair: Tomomi Matsui, Department of Mathematical Informatics, Graduate School of Information Science and Technology, The University of Tokyo, Bunkyo-ku, Tokyo, 113-8656, Japan, tomomi@misojiro.t.u-tokyo.ac.jp

1 - Home-away Assignment Problems in Sports Scheduling

Tomomi Matsui, Department of Mathematical Informatics, Graduate School of Information Science and Technology, The University of Tokyo, Bunkyo-ku, Tokyo, 113-8656, Japan, tomomi@misojiro.t.u-tokyo.ac.jp, Ayami Suzuka, Ryuhei Miyashiro, Akiko Yoshise

Suppose that we have a timetable of a round-robin tournament with a number of teams, and distances among their homes. The home-away assignment problem is to find a home-away assignment that minimizes the total traveling distance of the teams. We propose an integer programming formulation and some rounding algorithms. We also provide a technique to transform the problem to MIN RES CUT and apply Goemans and Williamson's algorithm for MAX RES CUT to the obtained MIN RES CUT instances.

2 - The Traveling Tournament Problem with a Constant Distance Matrix

Shinji Imahori, Department of Mathematical Informatics, Graduate School of Information Science and Technology, University of Tokyo, 7-3-1 Hongo, Bunkyo-ku, Tokyo, 113-8656, Japan, imahori@simplex.t.u-tokyo.ac.jp, Nobutomo Fujiwara, Tomomi Matsui, Ryuhei Miyashiro

The traveling tournament problem is a sports timetabling problem that abstracts two issues: minimizing traveling distance and home/away pattern feasibility. For this problem with a constant distance matrix, we obtain a lower bound and propose some techniques to design good feasible schedules. In cases that the number of teams is 22, 28, 34, 40 and 46, our algorithm finds optimum schedules.

3 - Minimizing Carry-Over Effects in a Round-Robin Tournament

Ryuhei Miyashiro, Institute of Symbiotic Science and Technology, Tokyo University of Agriculture and Technology, Koganei, Tokyo, Japan, r-miya@cc.tuat.ac.jp, Tomomi Matsui

In a round-robin tournament, if a team plays team i then team j in the next match, the team is said to have a carry-over effect from i to j . For a schedule of a round-robin tournament, the variance of carry-over effects is an index of unfairness of the schedule. We address the problem of minimizing the variance of carry-over effects and propose a new algorithm, which substantially improves previous results.

■ MD10

S-Ming Il

Conic Optimization: Theory and AlgorithmsCluster: Mathematical Programming/Optimization
Joint Invited/Sponsored

Chair: Akiko Yoshise, Associate Professor, University of Tsukuba, Tsukuba, Ibaraki, Tsukuba, Ib, 305-8573, Japan, yoshise@sk.tsukuba.ac.jp

1 - Complexity of the Primal-Dual Path-Following Algorithms for the Determinant Maximization ProblemsYu Xia, The Institute of Statistical Mathematics,
4-6-7 Minami-Azabu, Minato-Ku, Tokyo, 106, Japan,
yuxia@ism.ac.jp, Takashi Tsuchiya

Determinants maximization with linear matrix inequality constraints is a generalization of the semidefinite programming (SDP). We give polynomial time complexity analysis for the path-following interior-point algorithm for the determinant maximization problem (maxdet-problem) based on symmetric Newton equations for commutative classes of scaling matrices. Our complexity bounds are compatible to their counterparts of SDP.

2 - Target Following Algorithm for Semidefinite ProgrammingChek Beng Chua, University of Waterloo, 200 University Ave.
W., Waterloo, ON, Canada, cbchua@math.uwaterloo.ca

We show that the v -space concept can be extended from linear programming to semidefinite programming. This extension is closely related to the notion of Cholesky weighted analytic centers introduced recently by the author. Using this new v -space concept, we propose a target-following algorithm that generalizes a similar algorithm for linear programming. We then derive polynomial time complexity bound of a weighted central path-following algorithm for semidefinite programming.

3 - A Sparse SDP Relaxation for Polynomial Optimization Problems over Symmetric ConesMasakazu Muramatsu, Dr., The University of Electro-
Communications, 1-5-1 Chofugaoka, Chofu-shi, Tokyo, 182-8585,
Japan, muramatu@cs.uec.ac.jp, Masakazu Kojima

We consider polynomial optimization problems (POPs) having symmetric cone constraints. This class of optimization problems includes polynomial SDP and polynomial SOCP. Our approach is to construct a hierarchy of SDP relaxation problems whose optimal values converge to the optimal value of the original problem. Exploiting sparsity to reduce the size of the SDP problems is also considered without losing the nice theoretical property of the hierarchy.

■ MD11

S-Boardroom

Optimal Scheduling and Planning for Power Systems under Market EnvironmentSponsor: Energy, Natural Resources and the Environment
Sponsored SessionChair: Jin Zhong, The University of Hong Kong, Dept. of EEE,
The Univ. of Hong Kong, Hong Kong, jzhong@eee.hku.hk**1 - Stochastic Optimal Dispatch against Transmission Line Failures**Lizhi Wang, University of Pittsburgh, 1048 Benedum Hall,
University of Pittsburgh, Pittsburgh, PA, 15261, United States,
liw18@pitt.edu

This paper presents a stochastic optimal dispatch approach to guard against transmission line failures. Comparing to the conventional deterministic $N-1$ criterion and some other stochastic approaches, this stochastic optimal dispatch has the following features. (1) Credit contingencies are determined by considering individual transmission line reliabilities and the network topology. (2) Preventive and corrective actions are integrated to protect the system in both pre- and post-contingency phases. (3) The hidden failure model presented by Chen (2004) is adopted to formulate the probability of cascading failures after a contingency occurs.

2 - Building Flexible and Efficient Resource Scheduling Solution in Fast Evolving Business EnvironmentYuan Liao, University of Kentucky, Dept. of Electrical & Computer
Engineer, Lexington, KY, United States, yliao@engr.uky.edu,
Xiaoming Feng

Resource scheduling problems in power industry are traditionally solved by customer developed algorithms that are hard to adapt to changing business logic. A flexible and adaptive approach is needed in the restructured power industry. Toward that objective, we will present a new approach that separates the problem modeling from the solution algorithm, uses structure based, problem domain knowledge agnostic decomposition approach, and utilizes commercial off the shelf optimization component.

■ MD12

S-Celestial Court-Jade

Strategic Issues in E-Commerce

Contributed Session

Chair: Peter Ammermann, Associate Professor, California State
University - Long Beach, Department of Finance, 1250 Bellflower
Blvd., Long Beach, CA, 90840-8505, United States,
pammerma@csulb.edu**1 - The Rise and Fall of Commerce One: An Unsuccessful Story in E-Commerce**Zhong-Xian Wang, Full Professor, Montclair State University,
Dept. Mgmt & Infor Systems, Montclair, NJ, 07043, United States,
wangj@mail.montclair.edu, Qiyang Chen

This study shows that for C1 (once traded over \$1,600 per share and now is selling at just cent) it was factors such as accelerated growth, poor decision-making and lack of funding that added to its downfall. As other dot.coms failed, we portray the typical challenges such companies faced and their impact on C1.

2 - Website Performance Analysis for e-Business: Focusing on the Internet Travel Agencies in KoreaMin Woo Lee, Graduate Student(Master), Graduate School of
Hankuk Aviation University, 200-1, Hwajeon-dong Deogyang-gu,
Goyang-City, Geonggi-do, 412-791, South Korea,
leeminu@hau.ac.kr, Duk Young Yoon

Many companies are making large investments in developing websites without measuring the website performance for e-business success. This study explores the relationship between the website quality and the financial performance of the Internet travel agencies in Korea applying the DeLone and McLean's IS Success Model. This study also investigates the most preferred website quality factors, their relevant importance, and the relationship between the website quality and the website preference.

3 - The Relationship Between Organizational Commitment and Job SatisfactionDeniz Kucukusta, MBA, Dokuz Eylul University, Center for
Quality and Excellence, Turkey, deniz.kucukusta@deu.edu.tr,
Erdogan Ekiz, Ozkan Tutuncu

The hotels involved in tourism industry and which forms the framework of industry are based on physical data and success of the facilities is wholly based on efficiency of human force. Depending on this, the education, improvement of the employee and job satisfaction is becoming important in hotels where face to face relationships are lived intensively and the labor turnover is high. Organizational commitment concept, examined from frame, has great impacts on withdrawal, absenteeism, and looking for job alternatives which affects the organization's service quality as well as the individual's life quality. This study has been conducted in hotels in Cyprus. The positions of employees in point of organizational commitment and job satisfaction have been analyzed. Research was conducted through a survey instrument consisting of an Organizational Commitment Questionnaire (Meyer-Allen Scale) with 3 factors, Job Satisfaction Questionnaire (JDI-Job Descriptive Index) with 5 factors and demographic factors. Data obtained in the study has been analyzed at the base of multivariate data analysis with SAS 9.0 statistical program and the results show that the relationship between job satisfaction and organizational commitment was significant. It was found out that organizational commitment was perceived more important than job satisfaction among employees. Besides, there is a negative high correlation between wage factor of job satisfaction and organizational commitment. The second variable was the "continuous commitment" which was one of the independent variables of organizational commitment. Research has shown that job satisfaction and organizational commitment lead to better organizational outcomes; such as profitability and customer satisfaction. This study should help hospitality managers how to satisfy their needs of employees and how to make them committed in order to improve productivity and create happier guests.

4 - Factors Influencing E-service Adoption of Internet Securities TradingSiriluck Rotchanakitumnuai, Department of Management
Information Systems, Faculty of Commerce and Accountancy,
Thammasat University, Thailand, rsiriluck@yahoo.com

As the Stock Exchange of Thailand (SET) has implemented Internet trading as a new electronic service delivery channel, the acceptance by investors can assist the SET in assessing the value of its implementation. The two beliefs of the Technology Acceptance Model (TAM), perceived ease of use and perceived usefulness, have not fully explained the electronic service users' acceptance in the context of Internet securities trading. The trust belief and flow control of Internet users' behavior are integrated into this study because they are important prerequisites for electronic service adoption. This research aims to determine the prerequisites of electronic service adoption. Exploratory factor analysis reveals five factors of the antecedents of adoption: information quality, ease of use, self control, accessibility, and trust. The trust and self control benefits have a positive impact on the adoption of Internet securities trading. Information accessibility is also useful in predicting adoption, but it has a negative impact on adoption.

Securities investors have a negative perception of the low speed of the Internet trading network system. Finally, perceived ease of use and information quality have no impact on adoption.

5 - SMEs and Hosted Accounting Systems: Factors for Successful Selection

Peter Ammermann, Associate Professor, California State University - Long Beach, Department of Finance, 1250 Bellflower Blvd., Long Beach, CA, 90840-8505, United States, pammerma@csulb.edu, Dorothy Fisher, Steven Fisher, Melody Kiang, Robert Chi

One of the significant effects of the internet has been to reduce the size disadvantage of small and medium-size enterprises (SMEs) relative to larger firms that can handle more functions, such as accounting, in-house. Hosted accounting software systems can provide SMEs with access to state-of-the-art accounting systems. In this study, we examine the benefits and pitfalls that SMEs face in selecting such systems and determine the critical factors for successful selection.

■ MD13

S-Celestial Court-Pearl

Information Sharing in Supply Chains

Contributed Session

Chair: Xiao Huang, University of Southern California, 3670 Trousdale Pkwy BRI 400C, BRI 401, Los Angeles, 90089, United States, xiao.huang@usc.edu

1 - Analyzing Information Delays in Supply Chains Using Transfer Functions

Kai Hoberg, Cologne University, Albertus-Magnus Platz, Colgone, Germany, Kai.Hoberg@uni-koeln.de, Ulrich Thonemann

We analyze the effect of information delays in a multiechelon supply chain. An echelon-stock policy is an inventory policy that can considerably improve supply chain performance using shared information on demand and inventories along the supply chain. However, its performance can decrease significantly in the presence of information delays. We analyze its performance in a supply chain with information delays and compare it with an adjusted echelon-stock policy that is invaluable to these delays.

2 - The Effects of Sharing Upstream Information on Managing Product Rollovers

Zhaolin Li, City University of Hong Kong, 83 Tat Chee Avenue, Hong Kong, Hong Kong, zherli@cityu.edu.hk

The frequent introduction of new products creates enormous challenges to managing product rollovers in multi-echelon supply chains. We study the effects of sharing the upstream information on product rollovers by comparing the performance of the supply chain partners before and after information is shared.

3 - Inventory Sharing in a Repeated Newsvendor Game

Xiao Huang, University of Southern California, 3670 Trousdale Pkwy BRI 400C, BRI 401, Los Angeles, 90089, United States, xiao.huang@usc.edu, Greys Sosic

We analyze the impact of repeated interactions on the retailers who face a newsvendor problem and share their residual inventory/demands. We assume that the retailers distribute the profit from inventory sharing according to the dual solutions of the transshipment. We characterize the subgame-perfect Nash equilibrium for some special case, and provide conditions for achieving a first-best solution. Finally, we develop a contract that induces a first-best solution under more general assumptions.

■ MD14

S-Celestial Court-Coral

Optimization in Medicine & Biology

Cluster: Medical Applications

Invited Session

Chair: Gino J. Lim, University of Houston, Dept. of Industrial Engineering, E206 Engineering Bldg 2, Houston, TX, 77204, United States, ginolim@uh.edu

1 - Gantry Angle Optimization for Radiation Treatment Planning

Gino J. Lim, University of Houston, Dept. of Industrial Engineering, E206 Engineering Bldg 2, Houston, TX, 77204, United States, ginolim@uh.edu

We present recent study on gantry angle optimization. Mixed integer programming formulations are developed for 3DCRT, IMRT, and a hybrid approach. We show comparisons of each set of optimal beam angles.

2 - Optimization Models and Large-Scale Computing for Disease Diagnosis

Eva Lee, Associate Professor & Director, Center for Operations Research in Medicine, Industrial & Systems Engineering, Georgia Institute of Technology, Atlanta, GA, 30332-0205, United States, evakylee@isye.gatech.edu, Jin Shi

A discriminant analysis approach is described for prediction of human cancer and general disease. The algorithm first identifies hidden patterns in biological and genomic data. These patterns are then used as attributes for an optimization-based predictive model. The model maximizes correct classifications while constraining misclassification rate. It allows a reserved judgement region. Prediction of human breast cancer, cardiovascular, and other disease will be presented.

3 - De Novo Protein Design with Flexible Templates

Christodoulos A Floudas, Professor, Princeton University, Department of Chemical Engineering, Princeton, NJ, 08544, United States, floudas@titan.princeton.edu, Ho Ki Fung

The primary objective in de novo protein design is to determine the amino acid sequences which are compatible with specific template backbone structures that may be rigid or flexible. We present novel quadratic assignment-like models for the de novo protein design problem with flexible templates. It is shown that challenging problems of 10^{45} can be solved to optimality.

■ MD15

S-Celestial Court-Amber

Methods and Applications of Forecasting

Contributed Session

Chair: Bernard Fong, Auckland University of Technology, Private Bag 92006 (WL2), Auckland, 1020, New Zealand, bfong@iee.org

1 - A Patent-based Cross Impact Analysis for Technological Forecasting of ICT

Changwoo Choi, PhD Student, Dept. of Industrial Engineering, Seoul National University, San 56-1, Sillim-dong, Gwanak-Gu, Seoul, South Korea, zesty96@snu.ac.kr, Chulhyun Kim, Juneseuk Shin, Yongtae Park, Seungkyum Kim

Cross Impact Analysis (CIA) has been used as a method for forecasting the emergence of technology. Conventional CIA, however, depends on experts' qualitative judgment or intuition and, thus, is hard to evaluate quantitatively the impacts between technologies. In this study, we employ the patent analysis in CIA to examine the impacts among technologies based on the multiple classifications of patents. The patent information is used because it facilitates quantitative analysis in CIA.

2 - Reverse Estimation of Internal Marketing Policy for Demand Forecasting of Internet Service

Yoonseong Kim, Yonsei Univ., 134 Shinchon-dong Seodaemun-gu, Seoul, South Korea, yoonseong@yonsei.ac.kr, So Young Sohn

In order to forecast the demand of information and communication service, it is important to consider not only endogenous variables representing service characteristic but also time varying exogenous variables such as marketing policy. However, in many cases, information regarding company's marketing policy is not available for public. We show how exogenous variables can be inversely estimated. Also, we propose a negative exponential growth curve model with time varying exogenous covariates.

3 - Dynamic Short-Term Traffic Flow Forecasting For Congested Freeway

Xiang Fei, Graduate Research Assistant, University of Maryland, Transportation Program, Civil and Environmental Department, College Park, MD, 20742, United States, xfei@umd.edu, Ke Liu

This paper proposed a new approach by integrating time series model with nonparametric approach to predict short-term congested freeway traffic flows. The key difference between the paper and the previous researches is that the proposed model can dynamically adapt to different traffic scenarios with a new introduced variable to represent the interactions of exogenous unquantifiable or non-easily quantifiable impact factors to the traffic flow pattern.

4 - A Simulation Model for Short Term Stock Market Analysis: Volatility Predictions

Bernard Fong, Auckland University of Technology, Private Bag 92006 (WL2), Auckland, 1020, New Zealand, bfong@iee.org

A simulation model is developed based on statistical data collected over 30 days for volatility prediction. Warrants and options are particularly vulnerable to short term volatility, where risk reduction. Our study uses a set of five stocks listed in the New Zealand Stock Exchange (NZX), the model based on moving average analysis provides reasonably accurate volatility forecasts for a range of fifteen to thirty trading days with comparison over analysis using MACD and RSI.

■ MD16

S-Celestial Court-Amethyst

Creative Teaching

Contributed Session

Chair: Melody Kiang, Professor, California State University, Long Beach, Information Systems Department, College of Business Administration, Long Beach, CA, 90840, United States, mkiang@csulb.edu

1 - Study of Kindergartner Work Pressure Based on Gray Theory

Cheng-Lian Liu, Graduate of Information Technology, Chao-Yang University of Technology, 6f No 12 Alley 15 Lane 82, Chan-Ping Street, Shin-Juan, 24251, Taiwan, chenglian.liu@gmail.com, Liu Yu-Yi

In recent years, there is a dramatic change in the economic living level and population structure, non-marriage or fewer children phenomena become more apparent in Taiwan. Therefore, most of all parents put more emphasis on the concept of high quality children's education. We point out the aims at investigating the work pressure faced by childhood care personnel and how they handle interpersonal relationship conflict in the preschool based on different background of children's care personnel.

2 - Study of Kindergartner Work Pressure Based on Fuzzy Inference System

Cheng-Lian Liu, Graduate of Information Technology, Chao-Yang University of Technology, 6f No 12 Alley 15 Lane 82, Chan-Ping Street, Shin-Juan, 24251, Taiwan, chenglian.liu@gmail.com

Most of all parents put more emphasis on the concept of high quality children's education. We point out the aims at investigating the work pressure faced by childhood care personnel and how they handle interpersonal relationship conflict in the preschool based on different background of children's care personnel. Through the use of data-oriented survey questionnaire, work pressure membership function is built up by using fuzzy theory.

3 - Constructing an IRT-Based Curriculum Recommending System

Shih-Chieh Su, Chaoyang University of Technology, 168 Jifong E. Rd., Wufong Township, Taichung., Taiwan, s9267604@cyut.edu.tw, Chin-Ling Lee, Cheng-Jian Lin

This study is to apply the concept of the CAT to a course recommending system. The system will present the curriculum teaching materials as unit module by a website. Each unit class is regarded as a test item and given a set of parameters. The learners are measured by the Maximum Likelihood Estimation according to the degree of their mastery learning. Throughout the experiment the system can recommend the unit materials suitable for the learners' abilities to achieve the adoptive learning.

4 - Harvesting the Wins: Creating and Training High Performance Teams

Bonnie Potter, University of Utah, 585 Komas Drive, Salt Lake City, UT, 84108, United States, bonnie.potter@hsc.utah.edu, David Giles, Margo Beecher

"Teamwork" is an over-used and misunderstood word. Talk and tactics for success abound, but genuine excellence is rarely found. Cultivating an environment of success requires sincere positive attitude, an atmosphere of trust, open communication, individual buy-in, and group recognition. We work to make the language of personal and team excellence a practical reality believing that excellence is the product of a self-perpetuating cycle of attitude and accomplishment.

5 - Selecting the Right Peer Schools for AACSB Accreditation

Melody Kiang, Professor, California State University, Long Beach, Information Systems Department, College of Business Administration, Long Beach, CA, 90840, United States, mkiang@csulb.edu, Robert Chi, Dorothy Fisher

For a business school, the selection of its peer schools is an integral component of the AACSB accreditation process. A school typically compares itself to institutions with similar structural and identity-based attributes. The selection process is critical and can have a significant impact on its accreditation. We apply Kohonen's SOM networks, an unsupervised learning neural network for clustering, to assist a school in identifying the right peer schools for AACSB accreditation.

■ MD17

H-Crystal Room 1

Integrated Demand and Supply Management

Cluster: Supply Chain Planning & Advanced Planning Systems
Invited Session

Chair: Werner Jammerneegg, Professor, Vienna Univ. of Economics and BA, Nordbergstrasse 15, Vienna, A, 1090, Austria, werner.jammerneegg@wu-wien.ac.at

1 - Integrated Inventory / Reference Price Models

Alfred Taudes, Head of Institute, Vienna University of Economics and Business Administration, Nordbergstrasse 15, Vienna, Vi, 1090, Austria, alfred.taudes@wu-wien.ac.at, Lisa Gimpl-Heersink, Johannes Fichtinger

So far, efforts for a joint optimization of the supply (procurement, production) and the demand side (price, promotion) have neglected demand side dynamics. In this work, we study inventory models, where demand is governed by a reference price model, where consumers not only react to the current price, but also to deviations from a reference price formed on the basis of past purchases. In particular, simulations on the basis of Base Stock List Price policy will be investigated.

2 - Revenue and Demand Management: A Look at Scientific Models, Industry Requirements and APS

Rainer Quante, Dipl.-Wirt.-Inf., Vienna University of Economics and Business Administration, Nordbergstrasse 15, UZA IV/3, Floor/A, Vienna, Vi, 1090, Austria, rainer.quante@wu-wien.ac.at

Revenue Management is extensively studied in literature. This review points out the relationships between mathematical models in literature, industry requirements and RM software tools. For this purpose, the applicability of those models to industry requirements is analyzed and an examination how far scientific models are implemented in state-of-the-art APS is presented. Disparities are highlighted and potential for further research as well as for future software developments is shown.

3 - Reducing Retailer's Supply Chain Risks by Integrated Demand and Inventory Management

Gerald Reiner, Vienna University of Economics and Business Administration, Nordbergstrasse 15, Vienna, A, 1090, Austria, gerald.reiner@wu-wien.ac.at, Martin Natter

Technology advances have shortened the life cycles for many products (e.g., in the mobile phone industry) and drastically increase the penalty of holding obsolete finished goods inventory. Standard forecasting methods lead to high forecasting uncertainty and high safety inventories. Our contribution describes a systems dynamics model and its validation. We show how a modified base stock policy that considers the product life cycle and markdown pricing components perform in such an environment.

4 - Robust Inventory Decisions

Werner Jammerneegg, Professor, Vienna Univ. of Economics and BA, Nordbergstrasse 15, Vienna, A, 1090, Austria, werner.jammerneegg@wu-wien.ac.at, Peter Kischka

We consider the newsvendor model under conditions of uncertainty, i.e. the demand distribution is not known exactly; it is assumed that it belongs to a set of distribution functions. The objective function is given by a mixture of expected profit and expected shortfall (conditional value at risk). Optimal robust decisions minimize the maximal opportunity cost that occur if the optimal quantity with respect to some demand distribution is not ordered (minimax-regret approach).

■ MD18

H-Crystal Room 2

Joint Session STSC Logistics/Stochastic Models: Transportation and Transport Logistics

Cluster: Shipping, Transport and Supply Chain Logistics
Invited Session

Chair: Jia Yan, Assistant Professor, Hong Kong Polytechnic University, Hung Hom, Kowloon, Hong Kong, Lgtjiay@polyu.edu.hk

1 - Measuring the Social Return to Infrastructure Investments Using Interregional Price Gaps: a Natura

Zhigang Li, Assistant Professor, University of Hong Kong, Pokfulam Rd., HK, zli@econ.hku.hk

The objective of this study is to provide microeconomic evidence on the welfare gain of transport infrastructure investments. Specifically, I consider an investment in China that doubles the tracks of a one-thousand-mile-long railroad in 1994. I estimate the impact of this investment on interregional price differences, finding that they are reduced by about thirty percent following the investment.

2 - A Cell-based Dynamic System Optimal Model and its Heuristic Solution Method for Emergency Evacuation

Henry Liu, Assistant Professor, University of Minnesota,
500 Pillsbury Dr. S.E., Minneapolis, MN, 55455, United States,
henryliu@umn.edu, Xiaozheng He

In this paper, we develop a dynamic system optimal (DSO) model to identify routes and schedules to evacuate affected populations to safety zones in the event of natural disasters or terrorist attacks. The DSO model embeds the cell transmission model for traffic flow representation and considers departure time as one of the decision variables. To reduce the computational cost for solving the DSO, a heuristic solution approach is proposed to provide a close approximation of system optimum.

3 - A Bayesian Approach to Estimate Discrete Choice Models Combining Multiple Data Sets

Jia Yan, Assistant Professor, Hong Kong Polytechnic University,
Hung Hom, Kowloon, Hong Kong, Lgtjiay@polyu.edu.hk

Discrete choice models are widely used in travel demand forecasting and Marketing analysis. This paper proposes a way to estimate discrete choice models combining different data sets based on the recent advancements in Bayesian statistics. Compared with the classical approach, the proposed one can improve estimation efficiency and has advantages in both calculation and interpretation.

4 - White-Knuckle Externalities

Seiji Steimetz, Assistant Professor, California State University,
Long Beach, 1250 Bellflower Boulevard, Long Beach, CA, 90840-4607, United States, ssteimet@csulb.edu

This paper develops a framework for estimating two distinct components of the externalities generated by rush-hour highway travel: time costs and non-time costs. Time costs reflect the value of travel delays, whereas non-time costs reflect the value of unobservables such as accident-avoidance efforts and other "white-knuckle costs". Estimation results suggest an overall congestion externality of \$1.80 per vehicle mile: \$1.00 attributable to travel delays and \$0.80 attributable to non-time costs.

MD19

H-Crystal Room 3

Risk Management Method and Control

Cluster: Web-Service Related Technology
Invited Session

Chair: Yiu-ming Cheung, Associate Professor, Hong Kong Baptist University, 7/F, Department of Computer Science, Hong Kong Baptist University, Kowloon Tong, NA, Hong Kong,
ymc@Comp.HKBU.Edu.HK

Co-Chair: Sulin Pang, Professor, Jinan University, China,
pangsulin@163.com

1 - Analysis of Chinese Enterprises Foreign Exchange Risk and Its Control Methods

Jianhui Yang, Professor, South China University of Technology,
China, yjh-3264@163.com

There is necessity to identify the foreign exchange exposure, its characteristics and constitute factors under current management floating exchange rate system. This article divides exchange risk of Chinese enterprises into three types—Transaction risk, Translation risk and Economic risk and analyse its decided factors and measure methods and gave the tactics of defend risk, we try to study the principle and methods to enhance the enterprise' management ability of foreign exchange risk.

2 - Research on Investment-Consumption Problem with Proportional Transaction Costs

Fuhua Guo, Professor, South China University of Technology,
China, guofuhua2004@yahoo.com.cn

Investment-consumption problem with proportional transaction costs is researched in this paper by the method of non-singular stochastic optimal control. It is easy to obtain buying, selling and no-transaction regions in the solvency region and corresponding optimal consumption policies, because the expressions of the optimization problem obtained from this method is quadratic. Optimal buying, selling and consumption policies are obtained explicitly, since the investor's utility is homothetic.

3 - Prediction for the Chaotic Time Series of Chinese Stock Market

Sulin Pang, Professor, Jinan University, China,
pangsulin@163.com, Chuyun Tang

This paper analyzes Chinese (Shanghai) composite index (SCI) based on the chaotic dynamics theory. The fractal dimension and embedding dimension of this time series are obtained by reconstruction technology. Then, an available algorithm to small data sets is used to calculate the largest Lyapunov index. Relying on the judgment of chaotic behavior in time series, short-term SCI is predicted by local methods. The result shows that this method for prediction has got good effect.

4 - Robust Stability for a Class of Delay Neural Networks with Nonlinear Perturbations: An LMI Approach

Ruliang Wang, Professor, Guangxi Teachers' University,
Department of Information Technology, China West Normal
University, Nanning, Gx, 530001, China, awangruliang@tom.com

In this paper, we consider a class of time-delay dynamical neural networks with nonlinear perturbation. Firstly, we derive a robust stability criterion independent of delay. Secondly, we provide a robust stabilization criterion via designing a memoryless state feedback controller. These sufficient criteria are given in terms of linear matrix inequality (LMI). The applicability of our results is demonstrated by means of two specific examples.

MD20

H-Jade Suite 1

Dynamic Programming Applications

Contributed Session

Chair: Lyn C. Thomas, Professor, School of Management, The University of Southampton, School of Management, The University of Southampton, Southampton, Ni, SO17 1BJ, United Kingdom,
L.Thomas@soton.ac.uk

1 - A Switching Model of Dynamic Asset Selling Problem

Mong Shan Ee, Doctoral Program in Policy and Planning Sciences,
Graduate School of Systems and Information Engineering,
University of Tsukuba, Tennodai 1-1-1, Tsukuba, 3058573, Japan,
shan@sk.tsukuba.ac.jp, Seizo Ikuta

Our research considers a new selling strategy called the switching strategy where a seller who wishes to sell multiple homogeneous assets is permitted to decide at each point in time between proposing and concealing a selling price. Our analysis clarifies some conditions where the switching strategy is optimal.

2 - An Optimal Control Policy For Facilities Where Customers Wait For Service

Avi Giloni, Assistant Professor, Sy Syms School of Business,
Yeshiva University, 500 West 185th Street, BH-428, New York, NY,
10033, United States, agiloni@ymail.yu.edu, Phil Troy

We investigate the possibility of increasing the revenues generated by state dependent revenue maximization when facilities have an ability to differentiate customers. We propose and characterize a state and super-group dependent revenue maximization policy that makes it possible for facilities to take advantage of their ability to differentiate customers. We show that this policy generates at least as much and often much more revenue than does state dependent revenue maximization.

3 - Revenue Management with Multiple Capacity Features

Baichun Xiao, School of Business, Long Island University, C.W.
Post, Brookville, NY, 11548, baichun.xiao@liu.edu, Wei Yang

Most revenue management models are developed based on the assumption that perishable products or services have only one dimensional capacity; i.e., number of units. In reality, however, products or services may have multiple capacity attributes. For example, container liners can allocate their shipping capacity between 20 foot and 40 foot containers with different volume but nearly the same weight. We study the revenue management problem with multiple capacity features and formulate the problem into a mathematical model. We derive the optimal solution and discuss the properties of the solution. Numerical examples are provided.

4 - Maximising the Survival Probability of Small Firms; Joint Production and Inventory Models

Lyn C. Thomas, Professor, School of Management, The University of Southampton, School of Management, The University of Southampton, Southampton, Ni, SO17 1BJ, United Kingdom,
L.Thomas@soton.ac.uk, Tom Archibald, Edgar Possani

Firms which are just starting out and have limited capital backing have a high mortality rate. Thus initially their aim is survival rather than profit maximisation. We develop joint production and inventory models, based on Markov decision process approaches for this situation and show how different the optimal behaviour should be compared with the profit maximising strategy. We also draw some implication on what this means for venture capitalists who often provide the capital for such firms.

■ MD21

H-Jade Suite 2

Portfolio Selection and Performance

Contributed Session

Chair: Chunhui Xu, Associate Professor, Chiba Institute of Technology, Tsudamuna 2-17-1, Narashino, 275-0016, Japan, xchunhui@yahoo.co.jp

1 - Defining Mutual Fund Performance Indices by Relative Efficiency

Sheng-Pen Wang, Associate Professor, Chang Gung University, Dept. of Business Administration, Taoyuan, 333, Taiwan, wangsp@mail.cgu.edu.tw

The popular indices of portfolio performance are the Jensen alpha and the Sharpe ratio. Improving the latter, we incorporate transaction costs and propose a relative efficiency measure for mutual fund performance using data envelopment analysis (DEA), which does not require the specification of a benchmark as in the Jensen index. The DEA approach in terms of input-output ratios is tested on empirical data and is compared to traditional indices of performance.

2 - A Generalized Network Model for Portfolio Selection and its Inverse Problem

Rongxing Gao, Professor, Institute of Mathematical Economics, Hunan University, Shijiaochong, Changsha, 410079, China, tdj740528@sina.com

In this paper, a nonlinear generalized network with multiplier model for portfolio selection is proposed and some multi-period problems in Finance are shown to be formulated in this model. Based on this thought of Wolfe's Reduced Gradient Method, a simple method locating the efficient solution is provided. And then, a generalized network model for portfolio and consumption choice is set up. Furthermore, the inverse problem of those model is discussed.

3 - Robust CVaR Approach to Portfolio Selection with Uncertain Exit

Dashan Huang, PhD student, Kyoto University, Dept. of Applied Math & Physics, Kyoto, 606-8501, Japan, dhuang@amp.i.kyoto-u.ac.jp, Frank Fabozzi, Masao Fukushima, Shu-Shang Zhu

To deal with the portfolio selection problem involving an uncertain exit time, the worst-case CVaR methodology is adopted in the case where no or only partial information on the exit time is available, and the corresponding problems are integrated into linear programs. Moreover, we present a method for specifying the uncertain information on the distribution of the exit time associated with exogenous and endogenous incentives. Numerical experiments show the usefulness of the proposed model.

4 - Optimization in Portfolio Rebalancing and Its Soft Solution Method

Chunhui Xu, Associate Professor, Chiba Institute of Technology, Tsudamuna 2-17-1, Narashino, 275-0016, Japan, xchunhui@yahoo.co.jp

This paper formulates portfolio rebalancing problems with an optimization model by taking the requirements on risk and return of a portfolio as the constraints and rebalancing cost as the objective function, and proposes a method to solve this complicated model basing on our soft approach for hard optimization. To test the model and the proposed method, we conduct rebalancing experiments with real data from New York stock market.

5 - Global Optimization of Value at Risk using Continuation Methods

Arun Verma, Quantitative Research, Bloomberg LP, 731 Lexington Ave, New York, NY, 10022, averma3@bloomberg.net

Value at Risk is defined as the maximum loss of a portfolio given a future time horizon within high confidence (or probability, typical values used are 95% or 99%). In our work we devise novel techniques to minimize the non-convex Value-at-Risk function. VaR has the following properties: 1. VaR is a non-coherent measure of risk; in particular, it is not sub-additive. 2. VaR also happens to be a non-convex (multiple local solutions). 3. VaR is a piece-wise non-linear function and thus a non-differentiable function of the independent variables, which are the weights of different securities in a portfolio. 4. The number of linear pieces is proportional to number of scenarios. The above properties make search for a global minimum of VaR a very difficult problem, in fact an NP-hard problem. We outline efficient algorithms for this hard problems using continuation methods for global minimum search. The results show that optimal VaR is within 1% of global minimum if found and as efficient as finding a solution to a convex conditional-VaR minimization problem.

Tuesday, 8:00am - 9:30am

■ **TA01**

S-Tang II

Reliability Models

Cluster: Quality, Statistics and Reliability - Joint Invited/Sponsored

Chair: Rong Li, Assistant Professor, Singapore Management University, 50 Stamford Road, #04-028, Singapore, 178899, Singapore, rongli@smu.edu.sg

1 - Markov Chain Computation Methods Using Lumpability Concepts

Marlin Thomas, Dean, Graduate School of Engineering & Management, Air Force Institute of Technology, 2950 Hobson Way, Wright-Patterson AFB, OH, 45433-7765, United States, mthomas@purdue.edu, Lin Zhang

Analysis of large Markov Chain models can be simplified through state space reduction when lumpability conditions can be applied. An approximation method is presented based on "near Markov" conditions that improves computation ease without compromising the structure benefits in modeling.

2 - Redundancy Allocation for Distributed Detection Network

Yong Chen, University of Iowa, 2138 Seaman Center, Iowa City, IA, United States, yongchen@engineering.uiowa.edu

Distributed detection network uses multiple sensors to detect multiple objects. Reliability of the distributed detection network is defined as the probability that all objects can be detected by at least one functioning sensors. This research studies the allocation problem of redundant sensors to optimize the reliability of distributed detection network. Heuristic and mathematical programming methods are developed and compared to solve the sensor redundancy allocation problem.

3 - Inventory Control for Critical Parts with Markovian Deterioration

Rong Li, Assistant Professor, Singapore Management University, 50 Stamford Road, #04-028, Singapore, 178899, Singapore, rongli@smu.edu.sg, Jennifer Ryan

We study a Bayesian inventory model for spare parts that are subject to Markovian deterioration. Information regarding part deterioration can be captured through condition monitoring. Optimal inventory policies are determined for parts that are ordered and monitored periodically according to endogenous demand (i.e., demand derived using life distributions and monitored deterioration).

■ **TA02**

S-Tang I

AI, ES, and Neural Nets Applications in Transportation

Cluster: Artificial Intelligence, ES and Neural Networks
Invited Session

Chair: Lee Han, University of Tennessee, Civil & Environmental Engineering, 112 Perkins Hall, Knoxville, TN, 37996-2010, United States, lhan@utk.edu

1 - A Neural Net Model for Preventing Garbage In Garage Out with Transportation Simulation Models

Jan-Mou Li, University of Tennessee, 223 Perkins Hall, Knoxville, TN, 37996-2010, United States, jli21@utk.edu, Lee Han

Traffic simulation software is now widely used. While the enticing 3D animation and functionalities often garner praises, the actual results often deviate significantly from the reality. A major source of the discrepancies is the quality of input data, including traffic demand, network representation, control devices, etc. This paper employs a real-world network to demonstrate how a -neural-net model may improve the input quality and, hence, the accuracy of the simulation.

■ **TA03**

S-Ballroom A

Analysis and Optimization of Simulation Output

Sponsor: Simulation
Sponsored Session

Chair: Loo Hay Lee, Associate Professor, National University of Singapore, E1A-06-05, 1 Engineering Drive 2, Singapore, NA, 119260, Singapore, iseel@nus.edu.sg

1 - Investigation on Linear Combinations of Variance Estimators of the Sample Mean

Wenchi Chiu, Department of Industrial Engineering, National Tsing Hua University, Hsinchu, Taiwan, wenchichiu@yahoo.com.tw, Wheyming Song, David Goldsman

A classical problem of stochastic simulation is how to estimate the variance of the sample mean from dependent but stationary outputs. Many proposed estimators of the variance of the sample mean are parameterized by batch sizes. In this paper, we discuss the idea of linear combination of the variance-of-the-sample-mean estimator that are parameterized by batch size. The objective is to minimize the variance of the linear combination such that the corresponding bias is below a specific threshold. Among all experiments we studied, the variance reduction of the linear combination of two standardized time series is about 70 %.

2 - A Two Phase Approach for Simulation-Based Optimization

Geng Deng, Graduate Student, University of Wisconsin-Madison, 4723 Sheboygan Avenue, Apt. 118, Madison, WI, 53705, United States, geng@cs.wisc.edu, Michael Ferris

Simulation processes typically provide black-box function evaluations, which may be subject to noise and expensive to evaluate. We describe a two phase strategy for simulation-based optimization. Phase I is a global exploration step that explores the entire domain and determines potentially good sub-regions for future investigation. Phase II is a local exploitation step that constructs a local response model, from which the optimum is determined.

3 - A New Framework for Multi-objective Simulation Optimization Problems

Loo Hay Lee, Associate Professor, National University of Singapore, E1A-06-05, 1 Engineering Drive 2, Singapore, NA, 119260, Singapore, iseel@nus.edu.sg, Ek Peng Chew, Suyan Teng

Many real world problems are multi-objective in nature, and simulations are needed to evaluate their performances. In order to find good designs for these problems, we develop a framework which integrates the multi-objective evolutionary algorithm with the multi-objective computing budget allocation algorithm. Numerical results for this new approach are shown.

■ **TA05**

S-Ballroom C

Operational Flexibility and Real Options

Cluster: Supply Chains
Invited Session

Chair: Lingxiu Dong, Assistant Professor, Olin School of Business, Washington University in St. Louis, Campus Box 1133, One Brookings Dr., St. Louis, MO, 63130, United States, dong@wustl.edu

1 - Operational Flexibility and Financial Hedging

Jiri Chod, Boston College, Commonwealth Ave 140, Chestnut Hill, MA, United States, chodj@bc.edu, Nils Rudi, Jan Van Mieghem

This paper investigates the relationship between flexibility and financial hedging in the mean-variance framework. Flexibility influences the firm's need to hedge by affecting profit variance. Furthermore, flexibility influences the firm's ability to hedge by affecting marginal efficacy of hedging. Overall, flexibility and hedging tend to be complementary in reinforcing each other's benefits to the firm.

2 - The Interaction of Technology Choice and Financial Risk Management

Onur Boyabatli, INSEAD, Boulevard de Constance, Fontainebleau, 77305, France, onur.boyabatli@insead.edu, L. Beril Toktay

This paper analyzes the interaction between technology choice (flexible vs dedicated) and financial risk management from an integrated risk management framework. Our analysis contributes to the understanding of the role of operational hedges as part of a firm's overall risk management strategy. We delineate the value and limitations of the flexible technology in the firm's overall risk management strategy and identify its impact on a firm's financial risk management strategy.

3 - Operational Hedging Strategies and Competitive Exposure to Exchange Rates

Lingxiu Dong, Assistant Professor, Olin School of Business, Washington University in St. Louis, Campus Box 1133, One Brookings Dr., St. Louis, MO, 63130, United States, dong@wustl.edu, Ping Su, Panos Kouvelis

We investigate the impact of operational flexibility on firms' economic exposure to currency fluctuations in the presence of global competition. We consider a global firm who sells as a monopolist in the domestic market, and also sells to a foreign market facing competition there from a local incumbent. We compare the effects of three operational strategies of the global firm: with no operational flexibility, with postponement flexibility, and with both postponement and allocation flexibility.

■ TA06

S-Sung I

Matching Capacity and Demand

Cluster: Production-Inventory Systems
Invited Session

Chair: Fikri Karaesmen, Koc University, Dept. of Ind. Eng., Koç University, Sariyer, Istanbul, 34, 34450, Turkey, fkaraesmen@ku.edu.tr

1 - A Network Organizations for Cooperation of Producers on Production Capacity

Baris Tan, Professor, Koç University, Rumeli Feneri Yolu, Sariyer, Istanbul, 34450, Turkey, btan@ku.edu.tr

An analytical model to analyze the operation of a network organization where producers cooperate on production capacity is presented. A single-unit-auction-based allocation mechanism is proposed to allocate an arriving order. The auction is first analyzed in a static setting. Then a continuous-time Markov chain model is used to analyze the system in a dynamic setting. The cooperation case is also compared with the no-cooperation case and also with the centralized operation of producers.

2 - Tactical Capacity Management under Capacity Flexibility in Make-to-Stock Systems

Tarkan Tan, Assistant Professor, Eindhoven University of Technology, Dept of Technology Management, Paviljoen F-07, Eindhoven, 5600MB, Netherlands, t.tan@tm.tue.nl, Osman Alp

In many production systems a certain level of flexibility in the production capacity is either inherent, or can be acquired. In that case, system costs may be decreased by managing the capacity and inventory in a joint fashion. In this talk we consider such a make-to-stock production environment with flexible capacity subject to periodic review under non-stationary stochastic demand, where our focus is on the tactical level capacity management.

3 - On Service Capacity Pooling and Cost Sharing Among Independent Firms

Saif Benjaafar, Professor & Director, Division of Industrial & Systems Engineering, University of Minnesota, Department of Mechanical Engineering, Minneapolis, MN, 55419, United States, saif@umn.edu, Yimin Yu, Yigal Gerchak

We analyze the benefit of service capacity pooling for a set of independent firms. Firms have the choice of either operating their own service facilities or investing in a facility that is shared. Firms decide on capacity levels to minimize delay and capacity investment costs. If firms decide to operate a shared facility they must also decide on a scheme for sharing the cost of capacity and on priorities for capacity usage.

4 - Dynamic Pricing in a Capacitated System with Fluctuating Demand.

Fikri Karaesmen, Koc University, Dept. of Ind. Eng., Koc University, Sariyer, Istanbul, 34, 34450, Turkey, fkaraesmen@ku.edu.tr, Lerzan Ormeci

We investigate the dynamic pricing problem in a make-to-stock queue with a fluctuating demand process. Using stochastic dynamic programming, we establish structural properties on the optimal pricing and replenishment policies. We also carry out a numerical study that supports the effectiveness of partially dynamic pricing policies where the prices may depend on the demand process but do not depend on the actual inventory position.

■ TA07

S-Sung II

Market and Customer Analysis

Cluster: Practice/Strategic Marketing
Invited Session

Chair: Dan Ma, University of Rochester, 399 Quinby Road, Rochester, NY, United States, MADA@simon.rochester.edu

1 - Personalized Information Aggregator and Filter: An Application of RSS Technology in the Internet

Dan Ma, University of Rochester, 399 Quinby Road, Rochester, NY, United States, MADA@simon.rochester.edu, Yanjie Zhao

The Internet is a major force to obtain, spread, and exchange information. A tremendous amount of information is available online. Web users are facing a problem of "information overload." The Really Simple Syndicated (RSS) technology works as an information aggregator and filter, which saves users searching costs as well as costs of downloading online advertisements. This paper conducts a cost-and-benefit analysis for RSS adoption, as also analyzes the RSS profitability for websites.

2 - Business Performance, Market Orientation and the Firm's Attitude

Arie Maharshak, PhD., Dept. Head, ORT Braude College, 51 Snunit St., Karmiel, 21982, Israel, a_m@netvision.net.il, David Pundak

The impact of a firm's 'Market Orientation' on its business performance is quite evident. A formal adoption of the basic marketing principles is not sufficient to produce business performance. It turns out that experience and intuition often stand in opposition to the scientific theory of marketing. Tools were developed for identifying the opinions of the firm's decision makers toward central marketing topics; thus demonstrating the gap between the formal and the actual firm's attitude.

■ TA08

S-Ching

Portfolio Decision Analysis

Sponsor: Decision Analysis
Sponsored Session

Chair: Ahti Salo, Professor, Helsinki University of Technology, Otakaari 1 M, Espoo, 02150, Finland, ahti.salo@tkk.fi

1 - Selecting Forest Sites for Voluntary Conservation in Finland

Antti Punkka, Researcher, Helsinki University of Technology, Otakaari 1 M, Espoo, 02150, Finland, antti.punkka@tkk.fi, Ahti Salo

In the national forest biodiversity program METSO, land-owners can voluntarily offer sites for fixed-term conservation in receipt of monetary compensation. The sites are evaluated and selected with regard to multiple criteria subject to a limited budget. We demonstrate the benefits of batch-mode portfolio selection in reserve selection, and illustrate how Robust Portfolio Modeling can capture incomplete site and preference information in the development of robust decision recommendations.

2 - Incomplete Cost and Budget Information in Robust Portfolio Modeling

Juuso Liesiö, Researcher, Helsinki University of Technology, Otakaari 1 M, Espoo, 02150, Finland, juuso.liesio@tkk.fi, Pekka Mild, Ahti Salo

Robust Portfolio Modeling (RPM) supports project portfolio selection in view of scarce resources, multiple criteria and incomplete preference information. We extend this methodology to account for interval-valued information about budgets and projects' costs. Specifically, we analyze efficient portfolios and determine at what budget levels (i) individual project should be surely selected and (ii) stated cost-benefit requirements on the optimal portfolio can be met.

3 - Dynamic Risk Management in Contingent Portfolio Programming

Ahti Salo, Professor, Helsinki University of Technology, Otakaari 1 M, Espoo, 00, 02150, Finland, ahti.salo@tkk.fi, Janne Kettunen

We extend the Contingent Portfolio Programming framework through Value-At-Risk constraints to ensure that the optimal portfolio satisfies investor's preferences. We also formulate the Risk Constraint Matrix which permits the specification of multiple risk constraints for different time periods and risk levels. Experiments suggest that the models are computationally tractable for problems of realistic size, and that extreme risks can be reduced without appreciable reduction in expected value.

4 - Supporting Road Asset Management with Portfolio Decision Analysis

Pekka Mild, Researcher, Helsinki University of Technology, Otakaari 1 M, Espoo, 02150, Finland, pekka.mild@tkk.fi, Ahti Salo

Road asset management typically involves considerable financial resources, several planning objectives and hundreds of competing proposals. We report recent experiences from projects where the Finnish Road Administration was supported by Robust Portfolio Modeling (RPM) in the development of road asset maintenance programs. The managers were particularly pleased with the ability to provide incomplete preference information and to obtain corresponding tentative priority lists.

■ TA09

S-Ming I

Scheduling in Production and Distribution Systems

Cluster: Scheduling

Invited Session

Chair: Mabel Chou, National University of Singapore, 1 Business Link, BIZ 1, #04-08, Singapore, mabelchou@nus.edu.sg

1 - Optimal Break-bulk Location and Storage Design in Maritime Chemical Distribution

Hong Choon Oh, The Logistics Institute - Asia Pacific, National University of Singapore, 119240, Singapore, K L Tong, I A Karimi

Sea transport is the predominant mode for shipping bulk liquid chemicals. For distributing chemicals to regional markets, some sort of transshipment is more economical than direct shipment. The paper addresses the optimal location and design of a break-bulk facility for distributing a bulk liquid chemical to the Asia-Pacific region.

2 - A Memetic Algorithm for Joint Replenishment Problem with Container-based Transportation Cost

Wikrom Jaruphongsa, The Logistics Institute - Asia Pacific, National University of Singapore, 119240, Singapore, isejw@nus.edu.sg, Zhe Liang

We consider the classical joint inventory replenishments with constant demand. Joint inventory replenishments are shipped using containers with a fixed capacity. Based on a power-of-two policy, we propose a memetic algorithm that combines strength of genetic algorithm and local search procedure.

3 - On Determining the Optimal Maintenance Frequency for a Family of Machines

Ming-Jong Yao, Associate Professor, Tunghai University, P.O. Box 985, Department of IEEL, Taichung City, TW, 40407, Taiwan, myao@thu.edu.tw, Jia-Yen Huang

In this study, we propose a new solution approach for solving the maintenance scheduling problem for a family of machines. To solve this problem, we conduct full analysis on the mathematical model. By utilizing our theoretical results, we propose a search algorithm that solves an optimal solution effectively.

4 - Scheduling Jobs with Uncertain Machine Assignment

Mabel Chou, National University of Singapore, 1 Business Link, BIZ 1, #04-08, Singapore, mabelchou@nus.edu.sg

We consider a set of jobs to be processed in a multiple-machine system. The machine assignment for each job is uncertain. We look into the properties of the optimal scheduling policy in such a system and show some interesting results for a large-scale system with a large number of jobs.

■ TA10

S-Ming II

Combinatorial Optimization: Polyhedra and Efficiency

Cluster: Discrete and Combinatorial Optimization

Invited Session

Chair: Wenan Zang, Associate Professor, University of Hong Kong, Department of Mathematics, Hong Kong, China, wzang@maths.hku.hk

1 - A Min-Max Relation on Packing Feedback Vertex Sets

Wenan Zang, Associate Professor, University of Hong Kong, Department of Mathematics, Hong Kong, China, wzang@maths.hku.hk, Xujin Chen, G. Ding, X. Hu

The purpose of this talk is to present a structural characterization of all graphs such that, for any nonnegative integral vertex weight function, the maximum cardinality of a feedback vertex set packing is equal to the minimum weight of a cycle. (Joint work with G. Ding, X. Hu, and W. Zang)

2 - Finding a Nucleolus of a Flow Game

Xiaotie Deng, Professor, City University of Hong Kong, Department of Computer Science, Hong Kong, China, cxdeng@cityu.edu.hk

We propose a polynomial time algorithm for finding the Nucleolus for a Flow Game, which settles an open problem proposed by Kalai and Zemel some twenty years ago. (Joint work with Qizhi Fang and Xiaoxun Sun)

3 - Translocation Distance: Algorithms and Complexity

Lusheng Wang, Associate Professor, City University of Hong Kong, Department of Computer Science, Hong Kong, China, cswangl@cityu.edu.hk

Genome rearrangement is an important area in computational biology and bioinformatics. There are three basic operations in this area: reversal, translocation, and transposition. Here we study the translocation operations.

Multi-chromosomal genomes frequently evolve by translocation events that exchange genetic material between two chromosomes. We will discuss both signed and unsigned cases.

4 - The Graphical Traveling Salesman Problem and A Related TDI Polyhedron

Wenan Zang, Associate Professor, University of Hong Kong, Department of Mathematics, Hong Kong, China, wzang@maths.hku.hk

Let $G=(V,E)$ be a graph, let A be the cutset-edge incidence matrix of G , and let $P(G)=\{x \in \mathbb{R}^E : Ax \leq \frac{1}{2}Ae, x \geq 0\}$. In this talk I shall present a structural characterization of all graphs G for which $P(G)$ is totally dual integral (TDI). (Joint work with G. Ding.)

■ TA11

S-Boardroom

Financial Modelling of Electricity Markets

Sponsor: Energy, Natural Resources and the Environment

Sponsored Session

Chair: Afzal Siddiqui, Lecturer, University College London, Department of Statistical Science, Gower Street, London, WC1E 6BT, United Kingdom, afzal@stats.ucl.ac.uk

1 - Analysing Microstructure Effects in the British Electricity Spot Market

Derek Bunn, dbunn@london.edu, Dipeng Chen

We analyse the effects of market structure, fuels, emissions trading and strategic behaviour in an empirical, high frequency model of British spot electricity prices. Using an original dataset, extracted from the market, to identify the outputs and reserve margins at individual company level, we have been able to identify some company-level influences in spot price formation, as well as the usual stochastic and fundamental effects.

2 - Consumption Efficiency and Deregulated Electricity Markets

Qiyang Ong, Department of Economics, National University of Singapore, ong_qy@yahoo.com.sg, Youngho Chang

This study finds that non-contestable consumers who pay flat tariff rates tend to over-consume during peak period and under-consume during off peak period under a demand weighted average nodal price and flat tariff pricing regime (DWANP-FT) in a deregulated electricity market. Contestable consumers at adjacent node are forced to subsidize the consumption of contestable consumers at far node and under-consume as a result. Contestable consumers at far node over-consume under DWANP-FT pricing relative to real time price-flat tariff pricing (RTP-FT). They can, however, over-consume or under-consume under real time pricing (RTP). The study also shows that the conditions under which the largest improvement in welfare can be reaped when consumers switch from DWANP-FT pricing regime to RTP-FT.

3 - Distributed Generation Investment Under Uncertainty by a Microgrid

Afzal Siddiqui, Lecturer, University College London, Department of Statistical Science, Gower Street, London, WC1E 6BT, United Kingdom, afzal@stats.ucl.ac.uk, Chris Marnay

We examine a microgrid's decision to invest in distributed generation (DG) that operates on natural gas. While the long-term natural gas cost is stochastic, we initially assume that the microgrid may purchase electricity at a fixed rate. Using the real options approach, we find natural gas generating cost thresholds that trigger DG investment and operational changes.

4 - A Sustainable Capacity Expansion Model in Competitive Power Markets

Chung-Li Tseng, chungli@umr.edu

This paper addresses the capacity expansion process of generation and transmission under competition. A planning model is proposed for the Regional Transmission Organization, from a long-term and system-wide perspective, to achieve sustainable capacity expansion. The development cycle of the power market is formulated mathematically as a dynamic system. Sustainable equilibrium of the capacity expansion process will be defined and obtained through some numerical examples.

■ TA12

S-Celestial Court-Jade

Empirical Studies in E-Commerce

Contributed Session

Chair: Sydney Chu., University of Hong Kong, Department of Mathematics, Hong Kong, Hong Kong, schu@hku.hk

1 - Are Sticky Customers More Valuable?

Lin Lin, Assistant Professor, Lehigh University, 621 Taylor Street, Bethlehem, PA, 18015, United States, lil204@Lehigh.EDU, Olivia Sheng, Paul Hu, Johnny Lee

Although visit-based measurement metrics exist for e-commerce, none have been empirically validated to reflect actual customer purchase tendency. In this paper, we study the relationship between two commonly used e-commerce metrics and customers' conversion tendency using empirical click-stream data from 8 major US e-tailers. Our study reveals that effective e-tailer metrics design should take into consideration the type of product (search or experience) being promoted

2 - Virtual Experience Influence on Consumer Learning

Wu-Hsuang Lee, Student, Institute of Commerce Automation and Management, National Taipei University of Technology, 1, Sec. 3, Chung-Hsiao E. Road, Taipei 1, Taipei, Taiwan, jason710718@yahoo.com.tw, Ching-Jui Keng

The Internet has the ability to serve as a powerful medium because consumers are able to interact with products thus simulating a new form of experience^o virtual experience. Hence, in a laboratory experiment this study empirically will be tested the impact of consumer exposure to different personal virtual experience for consumer learning. Furthermore, consumer product knowledge and need for closure may moderate the different types of personal virtual experiences and consumer learning.

3 - Factors Affecting Online Customer Loyalty

Chian Chen Huang, Feng Chia University, 100, Wenhwa Road, Seatwen, Taichung, Taiwan, neuneu1208@yahoo.com.tw

There's little empirical investigation or understanding of the retention of online customers has been presented in the literature. The objectives of this research are (1) to develop a model of the determinants of customer retention in web-based e-commerce, and (2) to examine the effects of these determinants on customer retention.

4 - An Optimization Modeling Framework for Maximum Resolution Topology of Internet Data

Sydney Chu, University of Hong Kong, Department of Mathematics, Hong Kong, schu@hku.hk

We advocate a general yet topologically driven optimization modeling framework for the intriguing question of what "shape" a set of given internet (market or otherwise) data is in. Our model bases on operational multi-attribute data from sources like GDI (Global Diffusion of Internet) and eBay.com to visualize the dimensions of the data records and determine maximally the resolution of sometimes subtle existence of dichotomy (or market efficiency).

■ TA13

S-Celestial Court-Pearl

Managing Uncertainties in Supply Chains

Contributed Session

Chair: Wanshan Zhu, Lee Kong Chian School of Business, #04-01 50 Stamford Road, Singapore, 178899, Singapore, adamzhu@smu.edu.sg

1 - An Investigation on Bullwhip Effect in Supply Chain: A Case Study on a High Voltage Products Manufacturer

Alireza Madadi, Engineer, FKCC, Iran-tehran-Beheshti AV., Tehran, Iran, amid_madadi@yahoo.com, Hamed Shojaie Baghini, Mohsen Akbarpour Shirazi

Bullwhip effect is one of the most important factors that cause decreasing Efficiency in supply chain. In this paper, authors first try to study the general concepts of Bullwhip effect, causes, ways of preventing that, and also methods of measuring this effect. Then, it is tried to suggest some tricks for a manufacturer of high voltage products, according to studying and simulating its supply chain, in order to increase efficiency.

2 - Optimal Financial Hedging and Operational Hedging of Risk-averse Firm

Wanshan Zhu, Lee Kong Chian School of Business, #04-01 50 Stamford Road, Singapore, 178899, Singapore, adamzhu@smu.edu.sg, Roman Kapuscinski

Risk-averse international firm faces exchange rate risk which can be mitigated by either financial or operational hedging. The optimal financial and/or operational hedging is studied in a dynamic and finite production capacity setting. The unique optimal hedging strategies are established theoretically and their relative efficiencies are investigated numerically.

■ TA14

S-Celestial Court-Coral

eHealth Technologies & Issues I

Cluster: Health Applications - Joint Invited/Sponsored

Chair: Joseph Tan, Professor, Wayne State University, 5201 Cass Avenue, Prentis 328.10, Detroit, MI, 48302, United States, an9188@yahoo.com

1 - Research Issues of Healthcare Privacy Framework in Mobile Ad Hoc Networks (MANETs)

Patrick Hung, Assistant Professor, University of Ontario Institute of Technology (UOIT), Faculty of Business and IT, 2000 Simcoe Street North, Oshawa, ON, L1H 7K4, Canada, patrick.hung@uoit.ca, Vivying Cheng

With recent advances in mobile technologies, there are increasing demands for ubiquitous access to various information services over a mobile ad-hoc network (MANET). Nowadays healthcare providers such as doctors and nurses can directly communicate with one another via wireless infrared beaming in their PDAs. To explore the potential in applying MANETs in the healthcare industry, this talk will address the research issues of healthcare privacy framework of adapting PDAs over MANETs.

2 - Clustering the Physicians' Behavior for Health Care Management via Hybrid Mining Approach

Fu-Chung Wang, NCCU, 11F., No.537, Rd. Jinggou 330, Taoyuan, Taiwan, 92356502@nccu.edu.tw, Jiann-Min Yang

The health care services are complex and uncertain. Managing will be a very important issue in the system. This study presents a hybrid mining approach in physicians' behavior for health care management. The design mainly based on clustering and neural network techniques. The proposed method demonstrates by real data sets that the approach can be used to build an effective model. After interviewing, it was proved better than the traditional approach and applied to support building knowledge.

3 - Mobile Health Technology of the Future: Using Proximity to Categorise Applications

Joseph Tan, Professor, Wayne State University, 5201 Cass Avenue, Prentis 328.10, Detroit, MI, 48302, United States, an9188@yahoo.com, Phillip Olla

M-Health can be defined as the use of mobile devices to transmit health and bio-medical data over mobile networks. There are a multitude of applications, devices, and communication technologies emerging in this new M-Health arena. This paper introduces the concept of 'Proximity' to categorize the mobile health applications into groups based on the distance between the user (Human) and the technology (device or sensor) being used. The three categories used are 'Tele', 'Derma', and 'In Vivo'.

4 - Optimizing Information Presentation in a Point-of-Care Clinical Reminder System

Kai Zheng, kzheng@andrew.cmu.edu, Michael Johnson, Rema Padman

This study employs first-order Markov models and sequential association rules to optimize information presentation in computer-based systems used for clinical care. We discover patterns in actual usage of a Clinical Reminder System based on clickstream data. The results provide insights for designing improved user interfaces that are consistent with clinicians' cognitive processes and clinical workflow.

■ TA15

S-Celestial Court-Amber

Decisions in Cooperated and Non-cooperated Environments

Contributed Session

Chair: Subhash Wadhwa, Prof, IIT Delhi, Mech. Engg. Deptt, IIT Delhi, Hauz Khaz, New Delhi, 110016, India, bibhushan.iitd@gmail.com

1 - Simulating a Network of Trading Agents

Rene Weiskircher, CSIRO, CSIRO CMIS Division, Private Bag 10, Clayton, VI, 3169, Australia, rene.weiskircher@csiro.au, Rodolfo Garcia-Flores, Simon Dunstall, Nectarios Kontoleon

We present a system that simulates producer, consumer and merchant agents who trade over a network. Negotiations between the agents determine the product flows in the network. The emphasis of our research is on understanding the effects of different agent negotiation strategies on the resulting flows and the profits of the agents. Our simulation system enables us to evaluate the influences of negotiation strategies, network topology and internal agent constraints on the resulting product flows.

2 - EU Commission - Appointment, Preferences and Institutional Relations

Mika Widgren, Professor, Turku School of Economics, Rehtorinpellonkatu 3, Turku, 20500, Finland, mika.widgren@tukkk.fi, Stefan Napel

The paper analyzes the appointment of the European Commission as a strategic game between members of the EU's Council of Ministers and the European Parliament. The focal equilibrium results in Commissioners that duplicate policy preferences of national Council representatives. In this paper we show both theoretically and empirically what prevents the European Commission from being a Council clone in aggregate.

3 - Characterizing and Modeling the Structure of Competition Networks

Bo Yang, Antai College of Economics and Management Management, Shanghai Jiao Tong University, Shanghai, 200052, China, brendayang7920@yahoo.com.cn, Xiaorong Chen, Wenqi Duan, Zhong Chen

Not similar with the current research interests on collaboration networks, this paper focuses on competition networks that are constructed on the basis of the omnipresent competition behaviors in socio-economical systems. We investigate the structure of an empirically-obtained competition network and find that four fundamental characteristics emerge simultaneously in it. Due to the current models being unable to effectively reproduce these observed characteristics, we propose a theoretical model that can predict empirical topological characteristics successfully. This research is supported by National Natural Science Foundation of China under Grant No. 70401019.

4 - A Decision Support System for Job-shop Scheduling

Subhash Wadhwa, Prof, IIT Delhi, Mech. Engg. Deptt, IIT Delhi, Hauz Khaz, New Delhi, 110016, India, bibhushan.iitd@gmail.com

Decision Support Systems (DSS) can greatly help the decision makers in complex semi-structured problems. Job-shop Scheduling has been traditionally believed to NP-hard for practical problems. Hence, a DSS was developed to model and analyze the most common types of job-shop scheduling problems. The DSS is capable of finding the optimal solution in case of finite size problems. In case of complex problems an integrated Genetic Algorithm is used to find the near-optimal solution.

TA16

S-Celestial Court Amethyst

Education and Knowledge Transfer

Contributed Session

Chair: Hyun-Jung Lee, PhD, Ewha Womans University, College of Business Administration, 11-1 Daehyundong Seodaemungu, Seoul, 120750, South Korea, hjung@ewhain.net

1 - Exploring New Tools for Open Learning in Qualitative Education and Research Associated with Surf Science and Technology

Jaromir Audy, Senior Lecturer, Dr., Edith Cowan University, South West Campus Bunbury, Bunbury, WA, 6230, Australia, j.audy@ecu.edu.au

Australians did not invent surfing, but it does occupy a unique geographical position that enabled Australian surfing to grow to an internationally recognised level and ignited an interest of young Aussies in surfing and surf science. Currently we have around 60 people studying, exploring and researching the scientific and technological aspects associated with the production and performance of surfboards. Over the course of several units the students are taught to understand materials, design features, quality management, standards and safety engineering. After acquiring the necessary skills, they are encouraged to design their own surfboard, shape it, manufacture it and test it. In an open learning environment they feel free to combine research science with hands-on skill and use their ideas. This approach produced a variety of different surfboards, examples of which are shown in the main section of this paper. So far, only little has been published about the effects of surfboard design and materials on performance and durability. From the published information it becomes clear that the opinion of various surfboard users and designers on the importance of surfboard design features with respect to performance is in conflict. Hence, our surf science students were surveyed. To assist in the analysis of this survey sample results, and to provide a quantitative comparison of relative importance of each qualitative criterion with respect to other criteria associated with surfboard design features and performance, a statistical method has been established. The results are discussed in the paper from both qualitative and quantitative point of view. It is suggested that this sort of information may be used to assist in the optimisation of surfboard production. Finally it appears that the surfboard production is a challenging task. Any improvements achieved in design, materials and performance can be incorporated into education and research and open new opportunities for industrial collaboration.

2 - Knowledge Creation Performance of Creative Problem Solving Method - Focused on Motivational Aspect

MeeSook Jung, Bucheon College, 424 Simgok-dong, Wonmi-gu, Bucheon-city, Kyunggi-do, South Korea, mschung@bc.ac.kr, Hyo-Gun Kym

The mechanism of knowledge creation has not been clearly explained. Particularly, this research used structured knowledge creation approach, TRIZ. The research method was a combination of a qualitative and a quantitative method. Analysis was made on data collected from 356 TRIZ cases. The analysis was done using the SEM. All five hypotheses were accepted. The results proved significant differences in path coefficient between groups according to whether to have a reward system.

3 - Choosing the Right MBA Schools: An Application of Self-Organizing Map Networks

Robert Chi, Professor, California State University at Long Beach, Information Systems Department, College of Business Administration, Long Beach, CA, 90840, United States, rchi@csulb.edu, Melody Kiang, Dorothy Fisher, Steven Fisher

The Self-Organizing Map (SOM) network, an unsupervised neural network, is a categorization network developed by Kohonen designed for solving problems that involve tasks such as clustering, visualization, and abstraction. We apply SOM networks to cluster the top 89 MBA schools ranked by US News and World Report into 4 segments and plot the results into a two-dimensional map for visualization. The resulting map should assist prospective students to identify and select the best-fit MBA programs.

4 - A Study on the Effect of Giver's Psychological Characteristics on Knowledge Transfer

Hyun-Jung Lee, PhD, Ewha Womans University, College of Business Administration, 11-1 Daehyundong Seodaemungu, Seoul, 120750, South Korea, hjung@ewhain.net, Hyo-Gun Kym

This research is to explore the relation between knowledge transfer and knowledge transfer ethics, self-interest, pure emotion and relational emotion in the light of the recognized relationship between recipient and giver, or we-ness, as major factor. It can be known that once Korean close relationship like we-ness is established no other negative mechanism can wield negative influences on the knowledge transfer among the members of the organization.

TA17

H-Crystal Room 1

Available-to-promise

Cluster: Supply Chain Planning & Advanced Planning Systems
Invited Session

Chair: Herbert Meyr, Vienna U. of Economics and Business Admin., Nordbergstr. 15, Wien, 1090, Austria, Herbert.Meyr@wu-wien.ac.at

1 - Are ATP Search Rules Reasonable?

Herbert Meyr, Vienna U. of Economics and Business Admin., Nordbergstrasse 15, Wien, 1090, Austria, Herbert.Meyr@wu-wien.ac.at

APS apply simple search rules for a real-time Single Order Promising (SOP) on basis of available inventories (ATP). Literature shows that Batch OP of several orders improves this first-come-first-served SOP. The paper discusses how a quoting of ATP, preceding SOP, can compare with BOP. LP models are used to model order quoting and promising for SOP and BOP. Simulation runs will show that, assuming sufficiently precise demand forecasts and intelligent quoting, real-time SOP can again improve BOP.

2 - Towards a Framework for Order-driven Planning in Build-to-order Scenarios

Thomas Volling, Department of Production and Logistics Management / Technical University Braunschweig, Katharinenstrasse 3, Braunschweig, 38106, Germany, t.volling@tu-bs.de, Thomas Stefan Spengler

The adoption of pull strategies in BTO-scenarios gives rise to a central paradigm shift in production planning. Since all business is linked to customer orders, it is the order-driven planning activities that determine the success of operations. Therefore, a clear understanding of the associated planning tasks order capturing and master production scheduling as well as their interplay is essential. Based on a formal analysis we provide a configuration scheme for quantitative decision support.

3 - Revenue Management Based Extension of ATP in a Make-to-order Environment

Stefan Rehkopf, Department of Production and Logistics Management / Technical University Braunschweig, Katharinenstrasse 3, Braunschweig, 38106, Germany, s.rehkopf@tu-bs.de, Thomas Stefan Spengler

In service industries Revenue Management provides mature decision support for order-acceptance. These methods can improve the ATP-functionality significantly: first in allocating resources in push-based settings and second by incorporating the opportunity costs of order-acceptance in pull-based settings. We provide a case study from the iron and steel industry to illustrate the benefits of Revenue Management based methods in a make-to-order environment.

■ TA18

H-Crystal Room 2

Joint Session SOLA/TSL: Cyber Transportation Logistics - The U.S. Perspective

Sponsor: Location Analysis
Sponsored Session

Chair: Yupo Chan, Department of Systems Engineering, University of Arkansas at Little Rock, 2801 South University, Little Rock, AR, 72204-1099, yxchan@ualr.edu

1 - Electronic Value Chains: Supply Chain Management and RFID

Rolf T. Wigand, Professor and Entergy Chair, University of Arkansas at Little Rock, 2801 South University, Little Rock, AR, 72204-1099, rtwigand@ualr.edu

Modern supply chains are viewed as demand chains. Recent information technology developments made it possible to view these chains as transparent demand chains and have revolutionized (increased effectiveness, transparency and speed) the entire effort of electronic supply chain management (SCM). The application of RFID and other IT has made this possible. Examples from Wal-Mart (for electronic SCM) and Metro Group AG (Future Store in Rheinberg, Germany) will be presented.

2 - Globalization of Customer-Centric Information Quality Management

John R. Talburt, Director, Axiom Laboratory for Applied Research, and Axiom Chair for Information Quality, University of Arkansas at Little Rock, 2801 South University, Little Rock, AZ, 72204-1099, jrtalburt@ualr.edu

The quality of entity resolution and customer recognition business processes have been primarily developed in the context of a single country. The talk focuses on the use of standards that already accommodate internationalization, such as XML. This will promote the semantic interoperability of information systems that is independent from data representation issues.

3 - Dynamic Hierarchy of the Supply Chain Network

Mamdouh M. Bakr, Professor, University of Arkansas at Little Rock, 2801 South University, Little Rock, AR, 72204-109, mmbakr@ualr.edu

While the supply chain network extends in scope from the raw material source to the product user, the most active part of the network ends with the finished product manufacturer. This sub network consisting of processing, transportation and quality interface is hierarchal in nature and provides options for manufacturing and transporting the product. The purpose of this paper is to examine the nature of this network and to identify the related decision processes, which are necessary to optimize cost.

■ TA19

H-Crystal Room 3

Data Mining: Techniques and Applications

Cluster: Web-Service Related Technology
Invited Session

Chair: Indranil Bose, Dr, The University of Hong Kong, School of Business, The University of Hong Kong, China, bose@business.hku.hk

1 - Blog Mining: Extracting Knowledge from Blogs

Michael Chau, The University of Hong Kong, 7/F Meng Wah Complex, Hong Kong, mchau@business.hku.hk

Web logs, or blogs, have become more widely-used in recent years. Many people are now documenting their daily lives and expressing their opinions in blogs. These blogs contain such knowledge as market trends, customers' opinions, and social relationship that were previously unavailable. In this paper, we discuss how knowledge can be extracted from blogs automatically using various text mining and web mining techniques.

2 - Customer Analysis using Data Mining Techniques

Xi Chen, The University of Hong Kong, School of Business, The University of Hong Kong, China, chenxi@business.hku.hk, Indranil Bose

One of the most important jobs marketers do is to analyze the behaviors of customers in order to find possible business opportunities. Marketers use various customer data to perform analysis such as customer segmentation and basket analysis. Data mining techniques can help marketers discover valuable knowledge from these customer data.

■ TA20

H-Jade Suite 1

Linear Programming: Theory and Applications

Contributed Session

Chair: Sue Abdinnour-Helm, Associate Professor, Wichita State University, FREDS Box 77, 1845 Fairmount, Wichita, KS, 67226, United States, sue.helm@wichita.edu

1 - The Missing 10 Lines of Code in your LP Package

Moshe Sniedovich, Dr, University of Melbourne, Department of Mathematics and Statistics, Parkville, 3052, Australia, m.sniedovich@ms.unimelb.edu.au

In this presentation I report on my attempts over the past ten years or so to convince LP software developers to add 10-20 lines of code to the sources code of their LP solver so that it will be capable of solving a certain class of interesting, difficult, nonlinear optimisation problems. I shall explain what these lines are, what kind of nonlinear optimisation problems they can solve and where such problem appear in Nature.

2 - A Note on Reduced Cost of Linear Program

Vincent Li, Assistant Professor, National Dong Hwa University, National Dong Hwa University, Shou-Feng, Hualien, 974, Taiwan, vli@mail.ndhu.edu.tw, Ningxiang Xu

Simplex method can show whether the underlying linear programming problem has alternative optimal solutions by checking the reduced costs of nonbasic variables. If some of these costs are equal to zero, the corresponding variables can enter the basis without changing the optimal objective function value. We will present an alternative proof that shows variables with positive reduced cost associated with an optimal solution will always be zero in any alternative optimal solutions.

3 - Improving the Assembly Line Operations at an Aircraft Company

Sue Abdinnour-Helm, Associate Professor, Wichita State University, FREDS Box 77, 1845 Fairmount, Wichita, KS, 67226, United States, sue.helm@wichita.edu

An Operations Vision saved an Aircraft Company over 30 million dollars. The success of the new vision is mainly attributed to a new Assembly Line Operation, which consists of two key elements: (a) A Methodology that focuses on work zones rather than tasks and (b) A Two-phased Assembly Line Model to balance the line. In addition to financial gains, the company reduced the total number of workstations from twelve to seven, improved workflow, efficiency, and productivity.

■ TA21

H-Jade Suite 2

Managing Risks in Different Markets

Contributed Session

Chair: Wing Hong Chan, Assistant Professor, Wilfrid Laurier University, School of Business & Economics, Wilfrid Laurier University, Waterloo, ON, N2L3C5, Canada, wchan@wlu.ca

1 - GreyART Financial Distress Prediction Model

Ming-Feng Yeh, Assistant Professor, Lunghwa University of Science and Technology, No.300, Sec. 1, Wanshou Rd., Taoyuan, 33324, Taiwan, mfyeh@mail.lhu.edu.tw, Chia-Ting Chang, Hao-Erl Yang

To provide a more powerful financial distress prediction model, this study developed a new performance index to solve the classification problem by determining the best result the GreyART network can attain. Besides, a growing extraction method for financial variables was employed to obtain a better model by using fewer extracted variables. The model was used to empirical data and the results showed that the classification accuracy was above 90% in the training and test phases.

2 - Integrating Risk Assessment and Credit Scoring Model for Banks

Kai-Ming Chang, Chang Gung University, 259 Wen-Hwa 1st Road, Kwei-Shan, Tao-Yuan, Taiwan, m9340101@stmail.cgu.edu.tw

Both of risk assessment and credit scoring are important indicators for banks to evaluate the payment capability of the loan applicants. We construct the model integrating risk assessment and credit scoring by Data Envelopment Analysis-Discriminant Analysis (DEA-DA) presented by Sueyoshi (2004) and compare with other discriminant analysis approaches. The results show that the performance of the model constructed by DEA-DA is better than others approaches.

3 - Behavior Score Model: An Essential Competitiveness Tool

Meko MC So, PhD Student, School of Management,
The University of Southampton, School of Management,
The University of Southampton, Southampton, SO17 1BJ,
United Kingdom, mekoso@soton.ac.uk, Lyn C. Thomas

Consumer credit is an increasingly important component of earnings and market values in the financial sector. The use of credit scoring model by financial lenders to examine consumer loan behavior has kept expanding in recent years. This presentation attempts to examine the use of Markov Chain model in behavioral score model.

4 - The Budget Allocation for Managing Risk in the Early Design Stage with Risk/Cost Function

Yu-Jing Lin, NTUST, 43 Keelung Road, Section 4, Taipei, Taiwan,
M9301107@mail.ntust.edu.tw, Shuo-Yan Chou

Abstract is not available at this time

5 - Dynamic Hedging with Foreign Currency Futures in the Presence of Jumps

Wing Hong Chan, Assistant Professor, Wilfrid Laurier University,
School of Business & Economics, Wilfrid Laurier University,
Waterloo, ON, N2L3C5, Canada, wchan@wlu.ca

This paper examines infrequent extreme news events as common jumps in foreign currency markets. We find significant common jumps in spot exchange rates and futures basis with a rich jump dynamics where the jump intensity and the jump sizes change over time depending on the market conditions. Our results indicate that optimal futures hedge ratio incorporating information from the common jump dynamics substantially reduce portfolio risk of foreign currencies.

Tuesday, 10:00am - 11:30am

■ TB01

S-Tang I

SPC for Multistage and Dynamic Processes

Cluster: Quality, Statistics and Reliability - Joint Invited/Sponsored

Chair: Kaibo Wang, HKUST, IELM, HKUST, Clear Water Bay, Kowloon,
Hong Kong, kbwang@ust.hk

1 - Adaptive Charting Techniques for Multivariate and Dynamic Processes

Kaibo Wang, HKUST, IELM, HKUST, Clear Water Bay, Kowloon,
Hong Kong, kbwang@ust.hk, Fugee Tsung

Recent years have seen an increasing demand for the quality control of multivariate dynamic systems. However, most conventional SPC schemes are inefficient in detecting time-varying shifts. This research will investigate a unified SPC framework for multivariate dynamic shift detection. Under this framework, an adaptive charting scheme and its Cumulative Sum (CUSUM)-type enhancement will be studied. Significant improvement has been proved by Monte Carlo simulations.

2 - A Chart Allocation Strategy for Multistage Processes

Ming Jin, Hong Kong University of Science & Technology, Tower
A 305A, HKUST, Clear Water Bay, Hong Kong, jinming@ust.hk,
Fugee Tsung

Recent research has paid great attention to control of multistage manufacturing processes (MMP). Statistical process control is a traditional method to monitor single stage processes; however, its efficiency deteriorates in MMP as control charts tend to ignore the inherent information between stages. Here, we introduce a chart allocation strategy in which the structure of the process has been considered to assure the best performance in monitoring a MMP based on traditional SPC charts.

3 - Multistage Process Fault Monitoring and Isolation using State Space Model

Yanting Li, PhD Candidate, HKUST, Room 403D, Tower A,,
HKUST, Kowloon, Hong Kong, ielyt@ust.hk, Fugee Tsung

In this paper we consider multistage process fault detection and isolation. We formulate it as a multiple hypothesis-testing problem. A new criterion for evaluating the fault detection and isolation capability is proposed; two new multistage process fault detection and isolation schemes are established. The comparisons of detection and fault isolation power between the conventional and the new methods show that the new methods are much better when more than one stages goes out-of-control.

4 - Control Charts Design for Monitoring Fractional Brownian Motion Processes

Kai-Hsiang Chang, NTUST, 43 Keelung Road, Section 4, Taipei,
Taiwan, M9301001@mail.ntust.edu.tw, Shuo-Yan Chou

Statistical process control (SPC) for short-term autocorrelated processes has received a great deal of attention recently. Approaches for dealing with such processes exist. However, no approaches available for dealing with long-term autocorrelated processes such as fractional Brownian motion (fBm), which has been proved a suitable model to describe certain processes. This paper designs a guideline for monitoring the fBm process by transforming the observations according to its properties.

■ TB02

S-Tang I

Genetic Algorithm Applications in Manufacturing Problems

Cluster: Artificial Intelligence, ES and Neural Networks
Invited Session

Chair: Pei-Chann Chang, Professor, Yuan Ze University, 135 Yuan Tung
Road, Chungli, TW, 320, Taiwan, iepchang@saturn.yzu.edu.tw

1 - Flexible Pavement Distress Index Formulation Using Genetic Algorithms

Zhongren Wang, Sr. Transportation Engineer, California
Department of Transportation, 1120 N Street MS-36, Sacramento,
CA, 95814, United States, zhongren_wang@dot.ca.gov, Lee Han

A generalized procedure for the formulation of Pavement Distress Index (PDI) is presented. The procedure automated the PDI formulation process by identifying DVs for user-defined distresses with the weight-curve fixed initially. Genetic Algorithms (GAs) are employed throughout this process. This method caters user-defined PDI scales, distress definitions, and determines DVs for individual distress. It facilitates the formulation of a PDI for any agency that is to implement a PMS.

2 - An Application of Genetic Algorithm for GaAs Semiconductor Manufacturing

Jih-Chang Hsieh, Assistant Professor, Department of Industrial
Management, Vanung University, No.1, Vanung Rd.,
Chung-Li, TY, 32061, Taiwan, hjc@vnu.edu.tw

This paper investigates the scheduling for GaAs semiconductor manufacturing by applying genetic algorithm. The scheduling problem is defined as a three-stage single-machine flowshop problem. Genetic algorithms are developed to minimize makespan for the cases in a real-world GaAs semiconductor manufacturing foundry. Genetic algorithms are compared with the dispatching rules running in the foundry. The result indicates that the performance of genetic algorithms has 8% improvement rate on average.

3 - A New Simulated Annealing to Solve Single Machine Bicriteria Scheduling Problems

Fuh-Der Chou, Ching Yun University, 229, Chien-Hsin Rd.,
Jung-Li, Taiwan, Jung-Li, Taiwan, fdchou@tpts7.seed.net.tw,
Hui-Mei Wang

This paper proposes a new simulated annealing in which considering the information of job's precedence in the stage of neighborhood generation. The objective is to minimize total weighted completion time subject to jobs' deadlines constraints. To examine the performance of the proposed simulated annealing, the approach is compared with mathematical programming model and other heuristics and results showed the new simulated annealing could obtain good enough solutions efficiently.

4 - A Case Injected Genetic Algorithm for Production Scheduling Problems

Pei-Chann Chang, Professor, Yuan Ze University, 135 Yuan Tung
Road, Chungli, TW, 320, Taiwan, iepchang@saturn.yzu.edu.tw,
Jih-Chang Hsieh

This paper presents a case-injected genetic algorithm (CIGA) to solve the production scheduling problems. The initial case base is generated by using general genetic algorithm (GA) for different problem sets. To solve a new problem, CIGA first retrieves the similar cases from the case base according to the two-phase similarity coefficient adaptation procedure developed in this research. Extensive experimental results show that CIGA outperformed the other GAs with better solution quality.

■ **TB03**

S-Ballroom A

Optimization via Simulation

Sponsor: Simulation
Sponsored Session

Chair: Jeff Hong, Assistant Professor, HKUST, IELM Dept., HKUST, Clear Water Bay, Hong Kong, hongjl@ust.hk

1 - Retrospective Approximation Algorithms for Stochastic Optimization of Convex Functions

Raghu Pasupathy, Assistant Professor, Virginia Tech, 221 Durham Hall, Industrial and Systems Engineering, Blacksburg, VA, 24060, United States, pasupath@vt.edu

The Stochastic Optimization (SO) problem is that of finding the minimum of an objective function observable only through a consistent estimator (e.g. Monte Carlo simulation). We present algorithms that efficiently solve the SO problem on convex objective functions through a sequence of quadratic minimization steps. Algorithm parameter choice is discussed.

2 - Simulation Optimization using Model Reference Adaptive Search

Michael Fu, University of Maryland, College Park, mfu@wam.umd.edu, Jiaqiao Hu, Steven I. Marcus

We apply the recently introduced approach of model reference adaptive search to the setting of stochastic optimization and report on some preliminary simulation results.

3 - A Quantile-based Robust Linear Programming

Jeff Hong, Assistant Professor, HKUST, IELM Dept., HKUST, Clear Water Bay, Hong Kong, hongjl@ust.hk, Xiangtong Qi

Coefficients of linear programs (LP) are often estimated from data. They are subject to data uncertainties. In this paper we use quantile as a measure of robustness and substitute the objective function and constraints of the original LP by their quantiles. To solve the new problem, we propose a gradient-based Monte Carlo algorithm that can be shown to converge to the optimal solution at least in an exponential rate.

■ **TB04**

S-Ballroom B

Revenue Management and Dynamic Pricing: Teaching and Applications

Cluster: Revenue Management and Dynamic Pricing
Invited Session

Chair: Goutam Dutta, Indian Institute of Management, goutam@iimahd.ernet.in

1 - Revenue Management in Railways: Current Status, and Implementation Challenges in Indian Railways

Goutam Dutta, Indian Institute of Management, goutam@iimahd.ernet.in

This paper starts with a survey of revenue management in railways. It then discusses two major success stories in Europe. In the third part, it discusses the current practices of revenue management in the second largest railway in the world, Indian Railways. The paper concludes with the scope of application of future research in this area of transportation industry in the Indian context.

2 - Experience of Teaching Revenue Management Program in India

Goutam Dutta, Indian Institute of Management, goutam@iimahd.ernet.in

In this paper, we discuss the story and development process of probably the first executive development course in Revenue Management in Indian Context. The course was conceptualized in 2003 and have been offered in the year 2004 and 2005. We discuss the choice of audience, course design, topic selection. The lack of awareness and availability of good Indian cases seem to be the bottleneck for further development of RM in India.

3 - Online Learning for Dynamic Pricing in the Presence of Strategic Consumers

Mikhail Nediak, Assistant Professor, Queen's School of Business, 143 Union Str., Kingston, ON, K7L3N6, Canada, mnediak@business.queensu.ca, Tanya Levin, Jeff McGill, Yuri Levin

We study the problem of dynamic pricing when consumers are strategic and have unknown preferences. The company learns demand through successive observations (online) and incorporates it in pricing decisions. We formulate the consumer choice model as a stochastic dynamic game and study its structural properties. Learning is integrated via an aggregating algorithm. We study the effects of strategic nature of consumers on the pricing policy of the company, and report numerical experience.

■ **TB05**

S-Ballroom C

Coordination and Competition in Supply Chains

Cluster: Supply Chains
Invited Session

Chair: Albert Ha, Professor, HKUST, Clear Water Bay, Hong Kong, China, imayha@ust.hk

1 - Orchestrating Service Competition among Non-Identical Suppliers

Saif Benjaafar, Professor & Director, Division of Industrial & Systems Engineering, University of Minnesota, Department of Mechanical Engineering, Minneapolis, MN, 55419, United States, saif@umn.edu, Ehsan Elahi

We consider a setting with a single buyer and multiple suppliers, where the buyer allocates demand among the suppliers based on the quality of service they offer. The supplier may vary in terms of their cost structures. We show how the buyer can use simple allocation functions to maximize the quality of service she receives from the suppliers. We characterize conditions where the buyer should give preferential treatment to the less efficient suppliers.

2 - An Investigation of Supply Chain Competition under General Network Structure

Deming Zhou, Assistant Professor, Decision Sciences and Managerial Economics, CUHK, K.K. Leung Building E, Shatin, NT, Hong Kong, deming@msmail.baf.cuhk.edu.hk

We study oligopolistic competition in general multi-tier acyclic production networks. We examine three categories of such networks, termed as the arborescent, hierarchical and general cases. The networks consist of sectors which contain multiple homogenous firms; the networks may include both assembly and distributive sub-components. Demand curves in end markets and production costs are taken to be linear. Equilibrium as well as nonequilibrium situations are analyzed for the networks.

3 - Capacity Games of Manufacturers Producing Partially Complementary Products

Yunzeng Wang, Case Western Reserve University, Weatherhead School of Management, Cleveland, OH, United States, yxw36@case.edu, Xiang Fang

Consider multiple manufacturers each producing a different product. The manufacturers rely on each other to fulfill a common demand stream from a type of customers who buy the multiple products as complementary sets. In addition, each manufacturer faces a separate customer type who buys only the manufacturer's own product. All streams of demands are uncertain. We explore the equilibrium behavior of manufacturers in choosing their individual production capacities or quantities.

4 - Supply Chain Contracting under Asymmetric Information and Competition

Albert Ha, Professor, HKUST, Clear Water Bay, Hong Kong, China, imayha@ust.hk

We investigate the problem of designing optimal contracts for supply chains under horizontal competition and asymmetric information. Based on a three-stage contracting game framework, we conduct a comprehensive comparison of the performance of the supply chains as well as the individual firms under different information structures. We also consider the issue of investing in vertical information sharing in the context of supply chain competition.

■ **TB06**

S-Sung I

Coordinating Component Inventory in Assembly Systems

Cluster: Production-Inventory Systems
Invited Session

Chair: Rick So, Professor, University of California - Irvine, The Paul Merage School of Business, University of California, Irvine, CA, 92697, United States, rso@uci.edu

1 - Centralization of Suppliers: The Impact of Modular Assembly on Supply Chain Efficiency

Fuqiang Zhang, Assistant Professor, University of California, Irvine, Merage School of Business, Irvine, CA, 92617, United States, fzhang@uci.edu, Tianjun Feng

This paper studies the impact of modular assembly on supply chain efficiency. We find that shifting from the traditional to the modular assembly approach has a two-fold effect. First, the module supplier always holds more component inventories than the suppliers in the traditional approach, which leads to a lower cost for the manufacturer. Second, if there is a shift in production time from the manufacturing stage to the supplier stage, then all firms are better off from such

a shift. This paper studies the impact of modular assembly on supply chain efficiency. We find that shifting from the traditional to the modular assembly approach has a two-fold effect. First, the module supplier always holds more component inventories than the suppliers in the traditional approach, which leads to a lower cost for the manufacturer. Second, if there is a shift in production time from the manufacturing stage to the supplier stage, then in general, the manufacturer and the supply chain will benefit from such a lead time shift.

2 - Component Sharing for Assembled Products

Joon Park, Assistant Professor, Singapore Management University,
50 Stamford Road, Singapore, na, Singapore, jpark@smu.edu.sg,
Siquan Wang, Rick So

In this research, we develop a math model to study component sharing for assembled products. We find that variance pooling from component sharing for assembled products can be over-estimated when component sharing is determined by component type. We also perform numerical experiments to gain further insights.

3 - Component Procurement Strategies in Decentralized Assemble-to-Order Systems

Rick So, Professor, University of California - Irvine, The Paul Merage School of Business, University of California, Irvine, CA,
92697, United States, rso@uci.edu, Yunzeng Wang, Xiang Fang

A manufacturer procures components from multiple suppliers for an assemble-to-order product, where product pricing depends on delivery lead times. The manufacturer uses a revenue-sharing scheme to coordinate independent suppliers' decisions on the production quantity. We formulate the problem as a Stackelberg game played by the manufacturer against her multiple suppliers and derive the optimal revenue-sharing scheme that maximizes the expected profit of the manufacturer.

■ TB07

S-Sung Il

Data Mining and Predictive Modeling in Marketing

Cluster: Practice/Strategic Marketing

Invited Session

Chair: Jianmin Liu, liujianm@wellsfargo.com

1 - A Neural Network Feature Selection Approach for Consumer Situational Choice Modeling

Peter Zhang, Associate Professor, Georgia State University,
35 Broad St., Robinson College of Business, Atlanta, GA, 30303,
United States, gpzhang@gsu.edu, Michael Hu, Murali Shanker,
Ming Hung

Understanding consumer choice is crucial to effective marketing management. This study focuses on two key issues in neural network modeling - model building and feature selection. Using the cross-validation approach, we address these two issues together and specifically examine the effectiveness of a backward feature selection algorithm for consumer situational choices of communication modes.

2 - Ensemble Methods Based on Classification Trees: Applications in Marketing

Jonathan Burez, Research Assistant, Ghent University,
Hoveniersberg 24, Ghent, 9000, Belgium,
jonathan.burez@ugent.be, Dirk Van den Poel

Several successful paths have been explored how to grow ensembles of classification trees: bagging, boosting (arcing), random forests and randomization. Analogous to Hamza and Larocque (2005), who performed analyses on 14 science-related datasets, this paper investigates their predictive performance on several marketing-related datasets (including churn prediction, credit scoring, leaflet optimization).

3 - A Network Equilibrium Framework for Internet Advertising: Models, Analysis, and Algorithms

Lan Zhao, State University of New York, College at Old Westbury,
Dept. of Math and Computer Sciences, Old Westbury, NY, 11568,
United States, zhaol@oldwestbury.edu, Anna Nagurney

We develop a network equilibrium framework for the modeling and analysis of competitive firms engaged in Internet advertising among multiple websites. The model allows for the determination of both the equilibrium online advertising budget as well as the advertising expenditures on the different websites. This paper adds to the growing literature of the application of network-based techniques derived from operations research to the advertising/marketing arena.

■ TB08

S-Ching

Panel Discussion on Decision Analysis in China

Sponsor: Decision Analysis

Sponsored Session

Chair: Shouyang Wang, Professor, The Chinese Academy of Science, Academy of Mathematics and Systems Science, sywang@amss.ac.cn

1 - Panel Discussion on Decision Analysis in China

Moderator: Shouyang Wang, Professor, The Chinese Academy of Science, Academy of Mathematics and Systems Science, sywang@amss.ac.cn, Panelists: Jian Chen, School of Economics and Management, Tsinghua Univ.; Jianmin Jia, Dept. of Marketing, Chinese Univ. of Hong Kong; Cuihong Yang, Institute of Systems Science, Chinese Academy of Sciences; Hanqin Zhang, Institute of Applied Mathematics, Academy of Mathematics and Systems Science, Chinese Academy of Sciences.

In this panel discussion session, invited panelists will provide an overview about teaching and research activities of decision analysis in China. They will discuss current problems and future challenges in the area, and talk about how decision analysis can be further promoted in China.

■ TB09

S-Ming I

Recent Advances in Scheduling

Cluster: Scheduling

Invited Session

Chair: Peerayuth Charnsethikul, International Graduate Program in Industrial Engineering, Kasetsart University, Bangkok, 10903, Thailand, fengprc@ku.ac.th

1 - Development of a Parallel Tabu Search Technique for Scheduling Problems

Pornthep Anussornnitisarn, Department of Industrial Engineering, Kasetsart University, Bangkok, Thailand, fengpta@ku.ac.th, Sittisak Teachamatheegul

Parallel computer implementations of tabu search can search through solution neighborhoods faster or explore more alternative solutions for a given amount of time. We develop a parallel tabu search algorithm and compare its merits to a serial implementation. We test the algorithm on NP-hard scheduling problems.

2 - The AGV Scheduling Problem with Alternative Pick Up/Delivery Points

Chatpun Kamyat, International Graduate Program in Industrial Engineering, Kasetsart University, Bangkok, 10903, Thailand, ocpky@yahoo.com, Peerayuth Charnsethikul

We consider the AGV scheduling problem for a set of pick up and delivery (P/D) points when there may be more than one alternative for each P/D point. A branch-and-bound algorithm is presented for this problem, lower bounding schemes, and heuristics based on Bender's decomposition.

3 - Activity Scheduling of a Mega-Project with Balancing Budget Allocations

Preecha Pantumsinchai, Faculty of Commerce and Accountant, Chulalongkorn University, Bangkok, Thailand, pricha@mfocus.co.th, Peerayuth Charnsethikul

The problem of sub-project scheduling within a mega-project is studied with the objective of balancing the annual budget distribution. Finding an appropriate schedule is equivalent to the NP-Hard resource leveling problem. We propose a heuristic for this problem, compare it against solutions produced by MS-Project and report our experiments.

4 - Job Allocations for a Single Machine within a Uniformly Random Scheduled Due Date

Suwitachorn Witthakul, International Graduate Program in Industrial Engineering, Kasetsart University, Bangkok, Thailand, witthakul@yahoo.com, Peerayuth Charnsethikul, Prapaisri Sudasna-Na-Ayudhya

A set of jobs with random due-dates are to be allocated so as to minimize the total production cost plus the cost of not meeting the due date. The problem is formulated as a stochastic knapsack with continuous random capacity. An exact procedure is proposed and experimented computationally.

5 - Parallel Computer Scheduling for Solving Large and Dense Linear Equations

Peerayuth Charnsethikul, International Graduate Program in Industrial Engineering, Kasetsart University, Bangkok, 10903, Thailand, fengprc@ku.ac.th

Solving linear equations using Gauss-elimination can be modeled as scheduling jobs on parallel machines with precedence constraints in order to minimize the total makespan. We report computational experiments using the LPT heuristic on 4 parallel processors and comparisons with the performance of a single processor.

■ TB10

S-Ming Il

Planning and Scheduling in Iron & Steel Industry (1)

Cluster: Discrete and Combinatorial Optimization
Invited Session

Chair: Jiyin Liu, Professor, Loughborough University, Business School, Loughborough, LE, LE11 3TU, United Kingdom, J.Y.Liu@lboro.ac.uk

Co-Chair: Lixin Tang, Institute of Logistics, Northeastern University, Shenyang, China, linxintang@mail.neu.edu.cn

1 - A Scheduling System for the Steelmaking - Continuous Casting Process of a Steel Plant

Hubert Missbauer, hubert.missbauer@uibk.ac.at,
Wolfgang Hauber, Werner Stadler

We describe algorithms and implementation results of a scheduling system for steelmaking - continuous casting (CC). Basis for the planning process is an approximate production plan for the CC's. The algorithm: (1) Scheduling the CC's considering resource constraints. (2) Scheduling of converter and refining stage, performing allocation and sequencing. (3) Improving the plan by means of an LP model. The system produces reasonable schedules and is accepted by the planners.

2 - Production and Logistics Scheduling in Iron & Steel Industry

Lixin Tang, Professor, The Logistics Institute,
Northeastern University, Shenyang, Ln, 110004, China,
lixintang@mail.neu.edu.cn, Jiyin Liu

Iron & steel industry is capital as well as energy intensive. Effective production and logistics scheduling in this industry can significantly reduce cost and energy consumption. In this paper we first introduce the production processes and production management problems in steel production and then review the major production and logistics scheduling problems and methods we have been working on. Finally some key issues in production and logistics scheduling for further research are identified.

3 - The Batching Decision Model and Algorithm in Steel-making and Continuous(r) Casting Production

Gongshu Wang, The Logistics Institute, Northeastern University,
Shenyang, Ln, 110004, China, w-gs@163.com, Lixin Tang

We investigate a batching decision problem that arises in the steel-making and continuous(r) casting production. It is formulated as a mathematical programming model with multiple and conflicting objectives. An improved tabu search algorithm is proposed for it. Computational results on the practical production data from Baosteel are presented. It is shown that the proposed method could produce significantly better plans, compared to the current manual plans.

4 - A Predictive Reactive Scheduling Method for Color-Coating Production in Steel Industry

Xianpeng Wang, The Logistics Institute, Northeastern University,
Shenyang, Ln, 110004, China, neu_wxp@163.com, Lixin Tang

In practical production environment, the generative schedules often need to be adjusted due to some unexpected events. The reactive scheduling is to reconcile the conflict between generative schedules and the current production status to maintain production continuity. In this paper, the reactive scheduling in color-coating production in steel industry can be formulated as a matching model that can be solved optimally. A real case study example illustrates the effectiveness of the method.

■ TB11

S-Boardroom

Problems in Forestry and Natural Resources

Sponsor: Energy, Natural Resources and the Environment
Sponsored Session

Chair: Glenn Weigel, Scientist, Pulp and Paper Research Institute of Canada (Paprican), 3800 Westbrook Mall, Vancouver, BC, V6S 2L9, Canada, gweigel@paprican.ca

1 - Optimization Applications for the Pulp and Paper Industry

Glenn Weigel, Scientist, Pulp and Paper Research Institute of Canada (Paprican), 3800 Westbrook Mall, Vancouver, BC, V6S 2L9, Canada, gweigel@paprican.ca

This paper describes a set of MIP modeling applications implemented at a Canadian pulp and paper producer. These include a strategic planning model focusing on raw material allocation and end-product range selection, a tactical planning model focusing on yearly production planning, and an operational planning model focusing on monthly production planning and transportation scheduling. These applications identify significant profit improvement opportunities.

2 - Prioritizing the Development of the National Energy and Resource R&D Program by AHP approach

Seong-Kon Lee, Researcher, Korea Institute of Energy Research, 71-2, Jang-dong, Yuseong-gu, Daejeon, 305-343, South Korea, sklee@kier.re.kr, Ho-Jung Ryu, Jong-Ho Park, Yong-Jin Yoon, Jong-Wook Kim

Due to the expiration of the previous national energy and resource R&D Plan (NERP) and the establishment of an efficient NERP system, Korean Government needs to make a strategic 10-year period NERP that improves the energy intensity and reduces the emission of GHG coping with the UNFCCC. We prioritize the development of NERP by using AHP and suggest that Government enable an effective strategic decision-making in Energy R&D policy.

3 - The Interdependent Urban Renewal Projects Selection under the Consideration of Resource Constraints

Wann-Ming Wey, Associate Professor, Department of Architecture,
National United University, No. 1 Lien-Da, Kung-Ching Li, Miaoli,
36003, Taiwan, wmwey@nuu.edu.tw, Kuei-Yang Wu

Urban renewal projects selection means identifying some alternative projects in order to maximize the net benefit and allocating resources among those alternatives within the given constraints. This research aims at developing an integrated approach for interdependent urban renewal projects selection problems using Fuzzy Delphi, Analytic Network Process concept and Zero-One Goal Programming.

■ TB12

S-Celestial Court-Jade

Marketing and E-Commerce

Contributed Session

Chair: Ting Lie, Assistant Professor, Yuan Ze University, 135, Far-East Rd., Chung-Li, Taoyuan, Taiwan, tinglie@saturn.yzu.edu.tw

1 - Credibility of e-WOM : Effects of Information Objectivity, Nationality, and Product Type

Cheol Park, Associate Professor, Korea University, School of Management, Jochwon, Yongi, Chungnam, 339-700, South Korea, cpark@korea.ac.kr, ThaeMin Lee

The perceived credibility was higher for the evaluative eWOM than for the factual eWOM, that Koreans perceived eWOM more credible than Americans, and that the perceived credibility is higher for search goods than for experience goods in U.S. In addition, the results supported the moderating effects of national culture and product types regarding the eWOM objectivity-perceived credibility relationship.

2 - A Product Evaluation System Based on Customer's Reviews on Products

Seunghoon Lee, Doctoral Student, Sogang University, 1 Shinsoo-Dong, Mapo-Ku, Seoul 121-742, Seoul, 121-742, South Korea, au4240@sogang.ac.kr, Jinhwa Kim, Hyunsoo Byun

As customer relations management is one of the most important areas in modern business, companies pay a great attention to customer feedbacks on their products. Existing product review systems simply offer customers to write review notes, or to select level of satisfaction in graphically notated choices on their products. This study presents a product evaluation system that converts textual product reviews by customers to quantitative and graphical information.

3 - A Visualized Product Recommendation System using Data Adjacency and Fisheye Views in Web Stores

Hyunsoo Byun, Doctoral Student, Sogang University, 1 Shinsoo-Dong, Mapo-Ku, Seoul 121-742, Seoul, 121-742, South Korea, elbim@sogang.ac.kr, Jinhwa Kim, Seunghoon Lee

Recommendation systems with web personalization techniques give customer loyalty, increase sales, and reduce advertisement cost to web stores. They also help customers cut off time for their search. This study suggests a recommendation system based on data adjacency theory to represent relationships among webs and a graph theory called fisheye views to visualize their relationships. It uses a set of log data in a web store. An empirical test proves the effectiveness of this method.

4 - Effect of Modality of Mobility on User Acceptance in Mobile Commerce

Ting Lie, Assistant Professor, Yuan Ze University, 135, Far-East Rd., Chung-Li, Taoyuan, Taiwan, tinglie@saturn.yzu.edu.tw

This study examines the effect of modality of mobility on the user acceptance in mobile commerce. The technology acceptance model with trust in mobile vendor is adopted to explain the user acceptance model of mobile commerce. Results suggested that the traveling mobility need demonstrates a significant moderating effect on the intention to adopt mobile commerce. Theoretical and managerial implications of the results are discussed.

■ TB13

S-Celestial Court-Pearl

Sourcing and Purchasing

Contributed Session

Chair: Yuqiang (Billy) Wang, Virginia Tech, 250 Durham Hall, ISE Dept., Virginia Tech, Blacksburg, VA, 24060, United States, billywang@vt.edu

1 - Global Sourcing and Economic Integration

N Viswanadham, Professor, Indian School of Business, Indian School of Business, Gachibowli, Hyderabad, 500032, India, N_Viswanadham@isb.edu, Kannan Balaji

In this paper, we propose a tax integrated mixed integer model, for optimally deciding the FDI-outsourcing alternatives at the various stages of a global supply chain. We analyze this model by incorporating FTZs on an 8-stage example supply chain

2 - Balanced and Synchronized Ordering in Supply Chains

Sheng Hao Zhang, Visiting Scholar, Department of Industrial Engineering and Logistics Management, The Hong Kong University of Science and Technology, Clear Water Bay, Kowloon, Hong Kong, shzhang@ust.hk, Ki Ling Cheung

We study a supply chain with one supplier and multiple retailers in which base stock policies are practiced. Specifically, we consider two replenishment strategies: synchronized ordering and balanced ordering. We present compelling results to explain how the supplier may benefit from synchronized ordering and examine numerically the cost impact to the retailers under the two rules.

3 - Impact of Dealers Incentives and Consolidation on a Manufacturer's Sales Variance

Usha Mohan, Researcher, Indian School of Business, Gachibowli, Hyderabad, AP, 500032, India, usha_mohan@isb.edu, Sunil Chopra, Nuri Sendil, Milind Sohoni

We model the effect of stair-step incentive (SSI) in an exclusive dealership and a non-exclusive dealership. For an exclusive dealer appropriate SSI with a positive bonus on crossing the threshold increase the expected sales and decrease the coefficient of variation of sales. If sales variance has a positive cost, a SSI, with a positive bonus, is superior to the scheme without a bonus. Further, SSI to non-exclusive dealers result in increase in variance and decrease in profits.

4 - Lead-Time Reduction in a Two-Level Supply Chain: Stackelberg vs. Cooperative Solution

Mingming Leng, Assistant Professor, Department of Computing and Decision Sciences, Lingnan University, Tuen Mun, NT, Hong Kong, China, mmleng@ln.edu.hk, Mahmut Parlal

This paper considers game-theoretic models of lead-time reduction in a two-level supply chain involving a manufacturer and a retailer, who respectively adopts the (Q, r) continuous-review inventory policy and the lot-for-lot production policy. We first develop a leader-follower game to find the Stackelberg equilibrium. Then, we investigate the cooperation and design a linear side-payment contract under which the supply chain-wide cost can be reduced to minimum and the two members are better off.

5 - A Joint Production and Delivery Schedule for a Single Vendor-Buyer System Over Finite Horizon

Yuqiang (Billy) Wang, Virginia Tech, 250 Durham Hall, ISE Dept., Virginia Tech, Blacksburg, VA, 24060, United States, billywang@vt.edu, Subhash Sarin, Devendra Tasgaonkar

In this paper, we address a joint production and delivery scheduling problem in which a single vendor supplies a single product to a single customer over a finite planning horizon. We consider a penalty for lost orders as well as costs resulting from setup, shipping and inventory holding. The objective is to determine a production/shipment schedule that minimizes these costs where the demand, production rate, and unit costs can vary from period and period.

■ TB14

S-Celestial Court-Coral

eHealth Technologies & Issues II

Cluster: Health Applications - Joint Invited/Sponsored Sponsored Session

Chair: Joseph Tan, Professor, Wayne State University, School of Business, 5201 Cass Avenue, Detroit, MI, 328.10, United States, an9188@wayne.edu

1 - A Hybrid Bayesian (r)C Rule Base Knowledge System for Lower Back Pain Diagnosis

Lin Lin, Assistant Professor, Lehigh University, 621 Taylor Street, Bethlehem, PA, 18015, United States, lil204@Lehigh.EDU, Olivia Sheng, Paul Hu, Joseph Tan

Knowledge acquisition bottleneck remains a time-consuming process for the development of knowledge systems. Although Bayesian network could alleviate such problems by extracting knowledge from data, the large amount of historical data required for training presents a challenge for knowledge workers. In this paper, we explore a hybrid knowledge engineering approach that utilizes knowledge acquisition to retrieve the knowledge structure and Bayesian learning to generate quantitative rules.

2 - Managing Length of Hospital Stay for Appendectomy: A Data Mining Approach

Paul Hu, Accounting and Information Systems., University of Utah, Utah, U, United States, paulhu@ust.hk, Tsang-Hsiang Cheng

In competitive markets, healthcare institutions must manage patients' lengths of stay, a critical indicator of their resource utilization efficiency and service quality. This study uses a computational approach to predict the LOS of patients receiving appendectomy. Logistic and Support Vector Machine is used to predict the targeted LOS and empirically evaluate the respective systems using clinical cases from a tertiary hospital in Taiwan. Implications for research and practice are discussed.

3 - E-Health Technologies: The Application of E-technologies for Health Promotion for Underserved Seniors

Joseph Tan, Professor, Wayne State University, School of Business, 5201 Cass Avenue, Detroit, MI, 328.10, United States, an9188@wayne.edu, T. Butler, L. Weglicki, J. Mendez, N. Awad, P. Jaroz, D. Ellis, Du Yufei

We report on preliminary results on the impact and efficacy of personalized educational technology programs on the reduction of health hazards and risks in underserved, urban, at-risk populations. After basic computer training, feasibility and the use of e-health prototype designed for individual healthy lifestyle and well-being of elderly citizens by engaging a few sites in anticipation of generalizing the project to targeted populations, including African Americans and other minorities.

■ TB15

S-Celestial Court-Amber

Applications of Economic Modeling

Contributed Session

Chair: Xinyan Zhang, Business School, Sichuan University, Sichuan University, Chengdu 610064, China, xinyaner@tom.com

1 - Wagner's Hypothesis: Evidence from Pakistan (1960-2003)

Shahid Malik, Loughborough University, Economics Department, Loughborough University, Loughborough, LE11 3TU, United Kingdom, s.h.malik@lboro.ac.uk, Eric Pentecost

This paper attempts to verify the validity of Wagner's hypothesis in case of Pakistan. The hypothesis is tested using time series data on public expenditure and GNP for 1960-2003. Unlike previously used conventional methods of testing we have employed the methodology of cointegration and the related notion of an error correction model. The preliminary results suggest that in case of Pakistan the growth in public expenditure is directly related to the growth in GNP as explained by Wagner's law.

2 - Scenario Evaluation for United Nations Framework Convention on Climate Change; the Case of Turkey

Caglar Guven, Professor, Middle East Technical University, Industrial Engineering Department, Inonu Bulvarı, Ankara, 06531, Turkey, cguyen@ie.metu.edu.tr

We present a framework as the basis for evaluating alternative energy policies vis-à-vis Turkey's commitments to UNFCCC. We describe and assess, in respect of capabilities and shortcomings, the mathematical models of energy and environment that are used for analysis. Various scenarios are generated and results are discussed. Comments are provided for a number of modelling issues.

3 - The Quantitative Mode of Port Hinterland and an Empirical Study

Dong Jie-shuang, University of Shanghai for Science and Technology, 516 Jun Gong Road, Shanghai, Shanghai, China, dongjieshuang@sohu.com, Cao Jing, Chen Yan

Hinterland development is the foundation for a port survival and development. The analysis of port hinterland's structure is necessary for any port relative planning and development decision. This paper takes Wenzhou Port as a case study, introduces the concept of locational quotient and location potential to establish an analytical model for the port's hinter land structure.

4 - The Importance Exploration of Urban Infrastructure

Zhang Yu, Sichuan University, 224#, Business School, Sichuan University, Chengdu, Si, 610064, China, fis0729@126.com, Liu Guangzhong

Since reform and opening was put in force in China, foreign investments and tourism has been the support of national economy and the new economic growth points. As we know, the precondition of their developments is perfect urban infrastructure. With linear regression, this article analyzes the relationship of urban infrastructure and foreign investments as well as urban infrastructure and tourism. Then we get some significant conclusions. Finally, correlative advice is given.

5 - The Analysis of Periodic Fluctuation in Real Estate Industry

Xinyan Zhang, Business School, Sichuan University, Sichuan University, Chengdu 610064, China, xinyaner@tom.com, Guangzhong Liu

This paper absorbs relevant research and commentary on real estate cycles, and more with comprehension, induction and innovation. Using the increasing rate of the sales proportion as the index, it analyze the cycle of real estate industry by case studies on China, Beijing, Shanghai, Shenzhen and Chengdu, analyze the relation between the increasing rate of the sales proportion and GDP, predict using GMDH method, and prove the practicability of the theory and method system.

■ TB16

S-Celestial Court Amethyst

Service Applications

Contributed Session

Chair: Zeynep Aksin, Koc University, Rumeli Feneri Yolu, Istanbul, TR, Turkey, zaksin@ku.edu.tr

1 - Establishment of Health Service Tracking System

Ling Li, Associate Professor, Old Dominion University, College of Bus & Pub Admin, Dept of IT and Decision Scie., Norfolk, VA, 23529, United States, lli@odu.edu

This research introduces the establishment of environmental health tracking system (EPHT). Methods for data collection, linkage, and analysis are discussed. EPHT provides information useful to bioterrorism and emerging infectious disease surveillance, including geographic tracking vital to epidemiologic analysis.

2 - Satisfaction and Loyalty of Customers in Insurance

Wen-Ping Wu, Takming College, No.56, Sec. 1, Huanshan Rd., Neihu, District, Taipei., Taiwan 11451, R.O.C., Taipei, No, Taiwan, wbwu777@yahoo.com.tw, Hsin-Yuan Chang, Shoue-Yu Huang

This study investigates the influence on the satisfaction and loyalty of customers in insurance policies. The results of the empirical study conclude that service quality, trust of corporation, servers, and the switching cost are important factors in the satisfaction and loyalty of customers. The authors suggest that insurance companies should improve their service quality and build good reputation to increase the satisfaction and loyalty of customers.

3 - A Research Framework for Non-consumer Services Supply Chains

Kannan Balaji, Research Fellow, The Logistics Institute Asia Pacific, Block AS6, Level 5, 11 Law Link., Singapore, Si, 119260, Singapore, tlikb@nus.edu.sg, Robert De Souza, Brian Thomas Eck, Mark Goh

The service sector has experienced robust growth in recent years. This naturally demands renewed attention and interest from service industry practitioners and academicians. While service marketing, service quality, and service operations, in general, have been well studied, however, not much research on managing operations for non-consumer supply chains exists. This paper presents a research framework for non-consumer services supply chains.

4 - Joint Flexibility and Capacity Design in Service and Production Systems

Zeynep Aksin, Koc University, Rumeli Feneri Yolu, Istanbul, TR, Turkey, zaksin@ku.edu.tr, Nesrin Cakan, Fikri Karaesmen, Lerzan Ormeci

For service and production systems with flexibility, the capacity optimization problem under uncertain demand is formulated as a two-stage stochastic optimization problem. The paper proposes a simulation-based optimization procedure for this problem using sample-path gradient estimation. The procedure is tested against a set of benchmark cases, and is used to explore the relationship between capacity and flexibility structure via numerical examples.

5 - Low Cost Air Carriers: Growth Strategies

Hemalatha Santhanam, Professor & Dean(Consultancy), Narsee Monjee Institute of Management and Higher Studies (Deemed University), Mumbai, India, 400056, India, hsanthanam_nmims@yahoo.com, Amit Pandit

The airline industry constitutes an extremely complex domain. The paper explores the Indian domestic civil airlines market where many new low fare air carriers are entering into service. It attempts to identify the major factors constituting the decision making process and determine the distinct segments by analyzing a consumer survey. This analysis, integrated with the study of the cost structure for the financial viability is used to develop Strategies

■ TB17

H-Crystal Room 1

Integrated Supply Chain Planning

Cluster: Supply Chain Planning & Advanced Planning Systems
Invited Session

Chair: Horst Tempelmeier, Professor, University of Cologne, Department of SCM and Production, Albertus Magnus-Platz, Koeln, D, 50374, Germany, tempelmeier@wiso.uni-koeln.de

1 - Forecast Model based Safety Stock Calculation

Michael Bick, Team Manager, axentiv AG, Universitätsstrasse 91, Cologne, D, 50931, Germany, michael.bick@axentiv.de

Using the forecast model chosen in demand planning as a basis for the method of safety stock calculation in production planning the organisation benefits in significant decreased stock level and improved planning processes. We present the concept and experiences from a pilot implementation with SAP APO

2 - The Basics of Lean SCM

Christoph Kilger, Member of the Executive Board, j&M Management Consulting AG, Willy-Brandt-Platz 5, Mannheim, BW, 68161, Germany, christoph.kilger@jnm.de, Kai Furmans

Traditional SCM approaches use extrinsic control concepts based on models representing the demand and/or supply capabilities of the supply chain. These models also imply the existence of a centralized decision making unit. In contrast, intrinsic control concepts are built into the supply chain components and their operational processes, e.g. lean manufacturing. We describe the basics of the Lean SCM framework, integrating extrinsic and intrinsic control mechanisms, and its application areas.

3 - Adaptive Resource Deployment in International Industrial Plant Engineering Projects

Jiayi Yang, Diplom-Kauffrau, Department of Business Information Systems, Abt-Jerusalem-Str. 4, Braunschweig, 38106, Germany, jiayi.yang@tu-braunschweig.de, Dirk C. Mattfeld

International industrial plant engineering projects often have to satisfy a given local content requirement. Under this constraint and a given project lead time costs are to be minimized. This challenge is met by combining two mathematical models to reach a solution: an international facility location problem and a resource-constrained project scheduling problem.

4 - Integrated Optimization of Safety Stock and Transportation Capacity

Horst Tempelmeier, Professor, University of Cologne, Department of SCM and Production, Albertus Magnus-Platz, Koeln, D, 50374, Germany, tempelmeier@wiso.uni-koeln.de

We consider a segment of a supply chain comprising an inventory system and a transportation system that cooperate in the fulfillment of stochastic customer orders. The inventory system is operated under a discrete time (s,q) policy with backorders. In a system of this kind accumulated backorders introduce lumpiness of transportation demand into the system. We study the connection between the safety stock and the number of available transportation resources, for example the vehicle fleet size.

■ TB18

H-Crystal Room 2

Joint Session SOLA/TSL: Cyber Transportation Logistics - The Chinese Perspective

Sponsor: Location Analysis

Sponsored Session

Chair: Yupo Chan, Department of Systems Engineering, University of Arkansas at Little Rock, 2801 South University, Little Rock, AR, 72204-1099, yxchan@ualr.edu

1 - 4th Party e-Community Platform for Air Cargo Logistics

Y V Hui, Department of Management Sciences, City University of Hong Kong, Tat Chi Avenue, Kowloon, Hong Kong, MSYERVAN@cityu.edu.hk, Lawrence C Leung

The planning of air cargo logistics is a complex task, involving collaboration of multiple logistics agents to deliver shipments timely, safely and economically. The decision support system and knowledge management on the 4th party e-community platform for air cargo logistics are discussed.

2 - RFID-enabled Inventory Management System for Warehouse Operations in China

Stephen C. H. Leung, Department of Management Sciences, City University of Hong Kong, City University of Hong Kong, Tat Chi Avenue, Kowloon, Hong Kong, mssleung@cityu.edu.hk, S.C. Lee

A Hong Kong-based company, which specializes in production of superbly crafted OEM leather goods exporting mainly to retailers in the U.S. such as Wal-Mart, has studied the potential benefits of RFID in their warehouse operations. Before mounting a full-scale RFID implementation, a proof-of-concept in Dong Guang warehouse has been conducted to define optimal technology combinations. In this talk, the scope of the study, issues encountered and results will be presented.

3 - Supply Chain Management as a Source of Competitive Advantage at Dell

Glen R. Burrows, Managing Director, Dell Hong Kong Limited, Quarry Bay, Hong Kong, Glen_Burrows@Dell.com

Logistics has played a key role in the success of Dell. Since founding of the firm in 1984, Dell has built an extremely efficient supply chain in order to support the Dell direct business model. The presentation will explore logistics as a source of competitive advantage at Dell, including comment on the role of logistics in Dell's growth in emerging markets like China.

■ TB19

H-Crystal Room 3

Semantic Web and Intelligent Web Services

Cluster: Web-Service Related Technology

Invited Session

Chair: Timon Du, The Chinese University of Hong Kong, KKL 113, Cuhk, Shatin, NT, Hong Kong, timon@cuhk.edu.hk

1 - Design of Intelligent Semantic Web Services

Sam Lee, Assistant Professor, Texas State University-San Marcos, 601 University Drive, McCoy College of Business Administration, San Marcos, TX, 78666, United States, SL20@txstate.edu

This work introduces an approach for designing intelligent semantic Web services, which are envisioned as system cells that actively discover, learn, and communicate knowledge on the Web. The approach adopts Semantic Web Services specifications that are supplied by the DARPA Agent Markup Language (DAML) program, utilizes a system behavior model for representing an intelligent agent, and proposes a high degree of automatic synthesis using code generation and program templates in Java.

2 - OntoEx: Extracting Ontology from Website Semi-Automatically

Feng Li, SUCT, School of Business Administration, SCUT, Guangzhou, GD, China, fenglee@scut.edu.cn, Timon Chih-Ting Du, Irwin Kuo-Chin King

Currently, the feasible ontologies are expensive for ontological engineering due to lack of technologies such as automatic or semi-automatic ontology extraction. Our semi-automatic ontology construction approach proceeds through representing organization of the Website, recalling previous ontologies to recognize concepts and relations, extracting concept from clustered instances, and amending generated ontology. Finally, revised ontology is stored into an ontology-base for future reuse.

■ TB20

H-Jade Suite 1

Networks and Graphs

Contributed Session

Chair: Rongbing Huang, Assistant Professor, York University, 4700 Keele Street, Toronto, ON, M3J 1P3, Canada, rhuang@yorku.ca

1 - Research on Prediction Algorithm of Lifting Scheme Based on Orthogonal Polynomial Fitting

lv Huixia(r), 264001, China, lvhuixia2004@163.com

Prediction algorithm of Lifting Scheme had been proposed using algebra polynomial fitting. But when the degree of polynomial is increasingly big, the regular equation group will be sick. To solve the problem, author devised prediction algorithm of orthogonal polynomial fitting which can be widely used in any case, and validated the validity of experiment results through MATLAB simulation using Legendre and Isometry Node orthogonal polynomial fitting.

2 - Empirical Bayesian Routing in Computer Networks

Kemal Gursoy, Associate Professor, Kean University, Willis Hall, Room 305-G, 1000 Morris Avenue, Union, NJ, 07083, United States, kgursoy@kean.edu, Cetin Seren

The contemporary computer networks are evolving under technological changes, as well as environmental uncertainties. An empirical Bayesian approach to the evolutionary process of random networks' topology may be fruitful to answer the realistic routing problems of computer networks.

3 - A Model of Placing a Liaison in the Same Level of an Organization Structure of a Complete K-ary Tree

Kiyoshi Sawada, Department of Information and Management Science, University of Marketing and Distribution Sciences, 3-1 Gakuen-nishi-machi, Nishi-ku, Kobe, 651-2188, Japan, Kiyoshi_Sawada@red.umds.ac.jp

This study proposes a model of placing a liaison which forms relations to $P(P=2,3,\dots,K)$ members with the same level in a pyramid organization structure which is a complete K-ary tree of height H. The optimal set of P members is obtained by maximizing the total shortening path length which is the sum of shortening lengths of shortest paths between every pair of all members.

4 - Combined Route Capacity and Route Length Models for the CVRP

Luis Gouveia, Univ of Lisbon, CIO, Campo Grande, Lisbon, Portugal, legouveia@fc.ul.pt, Tom Magnanti, Teresa Godinho

We consider two types of hop-indexed models for the unit-demand asymmetric Capacitated Vehicle Routing problem: capacitated models and hop-constrained models. Our results indicate that combining features from capacitated models together with those of circuit lengths can lead to formulations for the CVRP with a tight linear programming bound. We also examine the asymmetric travelling salesman problem.

5 - Horizontal Integration of Network Design with Multi-purpose Trips

Rongbing Huang, Assistant Professor, York University, 4700 Keele Street, Toronto, ON, M3J 1P3, Canada, rhuang@yorku.ca, Oded Berman

Multi-purpose trips are very common in our lives. We study a horizontal integration network design problem when multi-purpose trips occur. We propose a method which sometimes produces a tighter bound than the LP relaxation of our formulation. A dynamic programming algorithm is applied to the problem on a path. Although the objective function of the problem is not submodular, computational experiments show that the greedy heuristic performs very well.

■ TB21

H-Jade Suite 2

Strategic Management of Logistics

Cluster: Special Sessions

Invited Session

Chair: De-Bi Cao., Department of Industrial Engineering and Management, Tokyo Institute of Technology, 2-12-1 Okayama, Meguro-ku, Tokyo, 152-8552, Japan, caodb@me.titech.ac.jp

1 - Comparative Studies of the Japanese and Chinese Supply Chain Management

Sadami Suzuki, Tokyo Institute of Technology, ssuzuki@ie.me.titech.ac.jp, De-Bi Cao

This study is intended as a comparative study of the Japanese and Chinese companies. By using the data of SCM logistics scorecard (LSC) which was developed to self-evaluation of these companies, we try to figure out not only the features of the Chinese SCM structure but also their problems to establish efficient SCM. Analyzing the LSC data, results show that first, Chinese Companies tend to emphasize an agreement formation about transactions and second, leveling up their IT competence is one of the most important problems in order to build more efficient SCM.

2 - Optimal Fixed Price Incentive for Project Price Negotiation

M Kamrul Ahsan, Department of Management, Auckland University of Technology, Auckland, New Zealand, kamrul.ahsan@aut.ac.nz, Zhong Lin, De-Bi Cao

The FPI (Fixed Price Incentive) approach imposes either penalty or incentive for cost excess or cost savings. However, problems arise with target price and refunding rate of a project determined by negotiation and often require compromise with an unavoidable, unfair contract. In this paper we propose a model that resolves the unfair contract dealing of FPI. Our purpose is to find an optimal solution that maximizes total profit in the FPI approach. We use cooperative game theory and compare results with FFP (Firm Fixed Price) approach to demonstrate advantage of the proposed model.

3 - Closed-Loop Supply Chains in the Electrical and Electronics Industry of Japan

Tomoaki Shimada, : International University of Japan, 777 Kokusai-cho, Minami Uonuma-shi, Niigata, 949-7277, Japan, shimada@iuj.ac.jp

This study introduces the impact of the recycling laws on closed-loop supply chain activities in the electrical and electronics industry of Japan. We conducted comparative research on the three industries of home appliances, personal computers, and mobile phones, based on field interviews as well as on public data.

4 - An Analysis on Inventory Recovery Process in a Reverse Logistic System

De-Bi Cao, Department of Industrial Engineering and Management, Tokyo Institute of Technology, 2-12-1 Okayama, Meguro-ku, Tokyo, 152-8552, Japan, caodb@me.titech.ac.jp, Sadami Suzuki

We consider a closed-loop manufacturing system consists of external customer, procurement, production and reverse logistic. Target inventory level was set multiplying average demand and manufacturing lead-time. For seamless supply to market, a certain level of stock-in-process was secured. Our purpose of this research is to investigate the difference of system response between traditional forward manufacturing and closed-loop manufacturing while demand makes a sudden changes. The methodology, Laplace transform was used to derive complicated system response function.

Tuesday, 1:30pm - 3:00pm

TC01

S-Tang II

Panel Discussion: New Challenges of Quality Professionals in Asia

Cluster: Quality, Statistics and Reliability - Joint Invited/Sponsored Sponsored Session

Chair: Albert H.C. Tsang, Principal Lecturer, The Hong Kong Polytechnic University, Industrial & Systems Engineering Dept., Hung Hom, Kowloon, Hong Kong, Albert.Tsang@inet.polyu.edu.hk

1 - Panel Discussion: New Challenges of Quality Professionals in Asia

Moderator: Albert H.C. Tsang, Principal Lecturer, The Hong Kong Polytechnic University, Industrial & Systems Engineering Dept., Hung Hom, Kowloon, Hong Kong, Albert.Tsang@inet.polyu.edu.hk, Panelists: K.S. Chin, Associate Professor, City Univ. of Hong Kong; Aaron W.K. Kwok, Managing Director, TQM Consultants Ltd.; Albert H.C. Tsang, Principal Lecturer, The Hong Kong Polytechnic Univ.

This panel will invite research leaders and prominent industrialists in the Asian region to review the contemporary issues, emerging trends and new challenges in the practice of quality in Asia, and to offer a prognosis of the future roles of "Quality Professionals" in the region.

TC02

S-Tang I

Neural Networks and Data Mining

Cluster: Artificial Intelligence, ES and Neural Networks Invited Session

Chair: Jack Feng, Professor, Bradley University, 110 Morgan Hall, 1501 W. Bradley Ave., Peoria, IL, 61625, United States, cfeng@bradley.edu

1 - Tenfold Vs. Threefold Cross-Validation in Predictive Neural Modeling of Surface Roughness Data

Jack Feng, Professor, Bradley University, 110 Morgan Hall, 1501 W. Bradley Ave., Peoria, IL, 61625, United States, cfeng@bradley.edu

Cross-validation is critical in determining the quality of a predictive model and the costs in data collection and data mining. Several cross-validation (CV) techniques are available and tenfold CV is often recommended as the standard technique. On the other hand, the threefold CV has been widely used in the engineering literature without justification. This study compares the performance of tenfold over threefold CV in predictive neural modeling of data from machining surface roughness studies.

2 - The Integration of Rough Set and Neural Networks and its Application in Product Family Configuration

Zhonghao Wang, PhD student, Huazhong University of Science and Technology, Wuhan, China, wzh_zyy@263.net, Xinyu Shao, Guojun Zhang, Jack Feng

Acquiring the product configuration rules which reflect the mapping between the customer groups (or market segmentations) the clustering of product specifications remains the bottleneck in product family configuration system. It has been well recognized that the integration of rough sets and neural networks is very natural for their complementary features and a mass of successful engineering applications have proved that by eliminating the redundancy from database, rough set methods can greatly speedup the network training and improve the prediction precision. This study proposes an integrated data mining approach to synthesizing rough set model and back propagation neural networks model as well for acquiring the association configuration rules. The proposed data mining procedure consists of four essential steps: (1) Discretizing the values of training attributes; (2) Using rough set as the front end to simplify the training magnitude; (3) Utilizing BP neural networks to carry out the learning procedure; (4) Employing rough set to extract the association rules from the trained neural networks. The proposed approach is exploited to facilitate the discovery of configuration rules from the refrigerator purchase transaction and prediction for the product design specification.

3 - Neural Network Trained by Particle Swarm Optimization for Diagnosis of Unexplained Syncope

Zhonghao Wang, PhD student, Huazhong University of Science and Technology, Wuhan, China, wzh_zyy@263.net, Liang Gao, Chi Zhou, Haibing Gao

Given the relative limitations of BP and GA based learning algorithms, Particle Swarm Optimization (PSO) is proposed to train Artificial Neural Networks (ANN) for the diagnosis of unexplained syncope. Compared with BP and GA based training techniques, PSO based learning method improves the diagnosis accuracy and speeds up the convergence process. Experimental results show that PSO is a robust training algorithm and should be extended to other real-world pattern classification applications.

4 - Data Mining for Product Family Design and Platform-based Product Development

Jianxin (Roger) Jiao, Nanyang Technological University, School of Mechanical & Aerospace Engineering, SG, SG, Singapore, jiao@pmail.ntu.edu.sg

Product family design and platform-based product development (PFD) has received much attention from both academic and industry alike. This paper presents the applications of data mining techniques to product family design and platform development. A decision framework is introduced to reveal a holistic view of PFD. The potentials of data mining at different stages of PFD are discussed, including platform identification, mapping relationships, as well as platform coordination.

TC03

S-Ballroom A

Models and Algorithms in Computational Biology and Bioinformatics

Cluster: Bioinformatics

Invited Session

Chair: Metin Turkay, Asst. Professor, Koc University, Center for Comp. Biology & Bioinformatics, College of Engineering, Sariyer, IS, 34450, Turkey, mturkay@ku.edu.tr

1 - Packing of Helices and Structure Prediction of Alpha Helical Proteins

Christodoulos A Floudas, Professor., Princeton University, Department of Chemical Engineering, Princeton, NJ, 08544, United States, floudas@titan.princeton.edu, Scott McAllister

The packing of alpha helical proteins has been a very challenging problem. We present a novel first principles framework to predict the structure of alpha-helical proteins that includes three main stages. These stages include a novel optimization model for generating inter-helical distance restraints between helices, the analysis and clustering of loop structures with flexible stems, and the prediction of tertiary structure using a hybrid deterministic global optimization algorithm.

2 - Prediction of Secondary Structures of Proteins Using a Two-Stage Method

Metin Turkay, Asst. Professor, Koc University, Center for Comp. Biology & Bioinformatics, College of Engineering, Sariyer, IS, 34450, Turkey, mturkay@ku.edu.tr, Ozlem Yilmaz, Fadime Uney Yuksektepe

Protein structure determination and prediction has been a focal research subject in life sciences. In this paper a novel two-stage method to predict the location of secondary structure elements in a protein using the primary structure data only is presented. In the first stage, folding type of a protein is determined using a novel multi-class classification approach. The second stage of the method uses available data available in PDB to determine location of secondary structure elements.

3 - Systemic Analysis of the Reconstructed Metabolic Network of Mus musculus for HuIFN-A production

Suresh Selvarasu, Graduate Student, National University of Singapore, Dept of Chemical & Biomolecular Engg, 4, Engineering Drive 4, 117576, Singapore, ssuresh@nus.edu.sg, Dong-Yup Lee, I A Karimi

Mammalian cell cultures are used for producing recombinant glycoproteins, which are mainly valuable therapeutic agents. A systems level analysis of mammalian cells is necessary for complete understanding of cellular metabolism & identifying pathways to overproduce recombinant glycoproteins. In this study, a genome scale metabolic network of Mus musculus has been constructed. The network consists of 984 metabolic reactions. The model is analyzed for cell biomass growth & HuIFN-A overproduction.

4 - 'Partial Correlation Coefficient Matrix' Approach for Protein Structure Classification

Raghuraj Rao, Research Scholar, NUS, Department of Chemical and Biomolecular, E5, Engineering Drive 4, NUS, Singapore, 117576, Singapore, raghuraj@nus.edu.sg, Samavedham Lakshminarayanan

Discrimination of multivariate sample measurements into functional/structural classes of proteins is a significant problem of interest in computational biology. A new Discriminating Partial Correlation Coefficient Matrix (DPCCM) method is proposed as an alternative classification approach. Performance of the method is compared using different protein datasets. DPCCM is observed to perform well for different validation tests in comparison with classical algorithms like LDA/SVM/ANN.

TC04

S-Ballroom B

Economics of Customization

Cluster: Mass Customization in Manufacturing

Invited Session

Chair: Paul Zipkin, Duke University, Fuqua School of Business, Durham, NC, 27708, United States, Paul.Zipkin@Duke.edu

1 - Standard versus Custom Products: Competitive Analysis

Nan Xia, University of Southern California, Marshall School of Business, Los Angeles, CA, 90089, United States, Nan.Xia.2008@marshall.usc.edu, Raj Rajagopalan

We study the competition between two firms, each of which can offer standard or custom products. Standard products are available immediately but may not

meet the customers' preferences, while custom products are available only after a lead time. We examine a three-stage game wherein the firms simultaneously choose the product type to offer, make variety or lead time decisions and finally set prices. The equilibrium variety, lead time and prices are characterized and insights are provided.

2 - Product-Line Competition: Customization vs. Proliferation

Haim Mendelson, Professor, Stanford University, GSB, Stanford, CA, 94305, United States, haim@stanford.edu, Ali Parlakturk

This paper considers the effects of competition between a traditional firm, which chooses a limited set of product configurations, and a customizing firm, which can produce any configuration to order. The firms also compete in prices. We derive the equilibrium for a duopoly competition between the two firms, study its characteristics, and compare it to the case of a single- and dual-channel monopoly. We identify market conditions that favor customization under competition.

3 - An Analysis of Customized Level on Mass Customization

Jianhua Ji, Vice Dean, Antai School of Management SJTU, Room401, Antai Building, 535 Fahuazhen, Shanghai, SH, 200052, China, jihji@sytu.edu.cn; jjh_01@sina.com.cn, Haijia Lian, Qiaolun Gu

The customization level of mass customization is analyzed, and the relationship between customization level, demand of products and firm's profit is discussed. First, the movement directions of customization level and demand are indicated, and then the demand elasticity is discussed. Second, the movement directions of customization level and firm's profit and the profit elasticity are researched. At last, a simple example is given to explain the conclusion.

4 - Purchasing Cost Management via Component Commonality

Angela Cheng, Hong Kong University of Science and Technology, Advanced Manufacturing Institute, Kowloon, Hong Kong, angelac@ust.hk, Mitchell M. Tseng

The concept of increasing component commonality for cost saving in purchasing is considered as theoretical possible but practically difficult. Based on the total cost model developed, shadow cost of component commonality can be assessed by incorporating the relationship between engineering design and bill of materials. Purchasing recommendations including component commonality across product family then are made. The presentation complete with a case study based on an electronics manufacturer.

TC05

S-Ballroom C

Channel Management: Quality, Service and a Case Study

Cluster: Supply Chains

Invited Session

Chair: Ozalp Ozer, Stanford University, 380 Panama Drive, Stanford, CA, 94305, United States, ozalp@stanford.edu

1 - Inspection Practices and Incentive for Quality Improvement in a Supply Chain

Albert Ha, Professor, HKUST, Clear Water Bay, Hong Kong, China, imayha@ust.hk, Qing Li

This paper investigates how different inspection practices affect the incentive for quality improvement in a supplier-buyer relationship. The buyer conducts plant inspection that provides an imperfect signal on the supplier's capability. Based on this signal, the buyer determines supply inspection and the supplier exerts effort to improve quality either simultaneously or sequentially. We analyze how the equilibrium behaviors depend on the decision structures as well as the parameters of the problem.

2 - The Dealer Purchase Option Program at Ford

Rose Peng, Revenue and Retail Management Manager Ford Motor Company, shuangl10@ford.com, Suzhou Huang, Kay-Yut Chen, Yi Lu

The Dealer Purchase Option (DPO) program was recently introduced to further improve the efficiency in the used-vehicle remarketing process. The idea of DPO rests on the premise that there are substantial cost savings if the auction process for off-lease cars can be circumvented by directly selling them to grounding dealers. However, detailed questions, such as what the relevant pricing strategy should be, and how the establishment of the DPO program will impact the auction market in the long run, are not amenable for obvious answers. In this presentation we describe a microeconomic simulator that can be used to optimize the relevant business strategies and to study the dynamic evolution of the used-vehicle market in the presence of the DPO program. We first introduce the business environment of DPO, and then describe the modeling framework, the econometric calibration process, and how the behavioral assumptions are validated using the methodology of experimental economics (collaborating with HPL).

3 - Coordination in a Dual-Channel Distribution System with Service Competition

Ozalp Ozer, Assistant Professor, Stanford University, 380 Panama Mall, Stanford, 94305, United States, ooz@stanford.edu, Kay-Yut Chen, Murat Kaya

We consider the coordination problem of a manufacturer who sells through direct and retailer channels that compete in service. Service is defined as product availability in the traditional retailer channel and as waiting time in manufacturer's direct online channel. Customers, who differ in their aversion to waiting, consider service levels as well as search costs in their purchase decision. We recommend dual channel strategies to the manufacturer by finding the optimal wholesale price contract to offer, and the optimal channel mix. We will also compare our analytical results to our observations from an experimental study.

TC06

S-Sung I

Production-Inventory Systems

Cluster: Production-Inventory Systems
Invited Session

Chair: Saif Benjaafar, Professor & Director, Division of Industrial & Systems Engineering, University of Minnesota, Department of Mechanical Engineering, Minneapolis, MN, 55419, United States, saif@umn.edu

1 - Priority and Dynamic Scheduling in a Make-to-Stock Queue with Demands of Different Variability

Apurva Jain, Assistant Professor, University of Washington, box 353200, UW Business School, Seattle, WA, 98195-3200, United States, apurva@u.washington.edu

We consider the scheduling problem in a make-to-stock queue with two demand classes, one with Poisson arrivals and the other with hyperexponential renewal arrivals. We provide an exact comparative analysis of three scheduling disciplines, FCFS and priority to either class. We then propose a dynamic scheduling heuristic for our system. Extensions to more than two classes and to the case where demand state is known are also discussed.

2 - Optimal Dynamic Production and Transshipment Policies for a Two-Location Make-To-Stock System

Hui Zhao, Assistant Professor, Purdue University, United States, zhaoh@purdue.edu, Vinayak Deshpande, Jennifer Ryan

We analyze the optimal production and transshipment policy for a two-location make-to-stock queuing system in which transshipments are triggered by both demand arrivals and production completions. Thus transshipment is used to achieve production flexibility as well as to fill emergency demands. We prove the optimal policy for production times following exponential distribution to be the "hedging point and state-dependent" rationing policies and then extend the results to Erlang distribution.

3 - Inventory Models under Accrual Accounting with Profit Targets

Candace Yano, Professor, University of California at Berkeley, yano@ieor.berkeley.edu, Humin Yan, Hanqin Zhang

We consider a retailer who seeks to meet corporate profit targets with high probability, where profits are calculated according to accrual accounting rules. We show that under accrual accounting, optimal inventory policies have a relatively simple structure, but under cash-basis accounting, they are extremely complicated and may have unintended consequences.

4 - Optimal Control of Assembly Systems with Multiple Stages and Multiple Demand Classes

Saif Benjaafar, Professor & Director, Division of Industrial & Systems Engineering, University of Minnesota, Department of Mechanical Engineering, Minneapolis, MN, 55419, United States, saif@umn.edu, Zhou Weihua, Mohsen Elhafi, Chung-Yee Lee

We consider the optimal production and inventory control in a multi-stage assembly system with multiple demand classes. Each assembly stage consists of a production facility with finite production rate. Demand classes differ in their demand rates and their shortage costs. We formulate the problem as a Markov Decision Process (MDP) and characterize the structure of the optimal policy.

TC07

S-Sung I

Customer Relationship Management

Cluster: Practice/Strategic Marketing
Invited Session

Chair: Jihong Jin, Wells Fargo Bank, 1200 Concord Ave, Concord, CA, United States, jihong.jin@wellsfargo.com

1 - Decomposition of US Treasury Debts' Break-Even Inflation

Jean Hu, Northwestern University, 718 Ascot Court, Libertyville, IL, 60048, United States, jh80@cornell.edu

U.S. inflation-indexed debt was accepted to help complete the market and reduce government's financing cost. However, this market has lower than expected volume and depth of investor participation. Using cointegration of macroeconomic variables and GARCH variants for volatility, daily yield spread between straight and inflation-protected bonds were decomposed into market's ex ante inflation and risk premia components. Coefficients of the mixture model shed more light on the valuation parity.

2 - The Impact of Context Effect on Product Design

Dilip Chhajed, Professor, University of Illinois at Urbana-Champaign, 1206 S Sixth St, Champaign, IL, 61820, United States, chhajed@uiuc.edu, Bin Shao

We present a new model of customer's buying behavior that explains the customer choice under the observed marketing phenomenon, "context effect", which suggests that the customer deviates from the standard rational choice model. Our model allows us to explore the effect of context effect on product design problem. We develop guidelines to help the managers in designing products and they also can be used for upselling - moving the customers to a higher level product.

3 - An Analysis of ECRM Strategy Adoption and its Impact on Business Performance

Jiajia Yeh, Feng Chia University, Taichung, Taiwan, M9315189@webmail.fcu.edu.tw

Effective relationship marketing strategy require accurate measurement of customer loyalty and a completed understanding of its impact on performance. Although such studies are plentiful for brick-and mortar firms, few attention for internet-based e-retailers. The regard to the implementation of E-CRM. The objective is to prove that e-commerce strategy indeed has influence on firm's performance of CRM through empirical research and relative theories.

4 - Rothmans Cigarette Brand Marketing: Intertextuality and the Decline of a Flagship Trademark

Timothy Dewhirst, Associate Professor, University of Saskatchewan, College of Commerce, Marketing, 25 Campus Drive, Saskatoon, SK, S7N 5A7, Canada, dewhirst@commerce.usask.ca

Julia Kristeva's concept of intertextuality is utilised to critically examine how the Rothmans cigarette trademark has been communicated to consumers from 1957 through 2005. Inter-textual messaging has been a successful strategy for several major Canadian cigarette trademarks to overcome advertising restrictions, yet the Rothmans case is notable because the trademark appears to have not exploited this strategy and to have lost market share as a result.

TC08

S-Ching

Issues in Decision Making

Sponsor: Decision Analysis
Sponsored Session

Chair: Jayavel Sounderpandian, Interim Dean, School of Business and Technology, University of Wisconsin - Parkside, 900 Wood Road, Kenosha, WI, 53144, Sounderp@uwp.edu

1 - Violations of Coherence in Subjective Probability: A Representational-Assessment Processes Account

David R. Mandel, Defence Research and Development Canada Toronto and University of Toronto, Defence Research and Development Canada, 1133 Sheppard Avenue West, P.O. Box 2000, Toronto, Ontario, M3M 3B9, Canada, mandel@psych.utoronto.ca

Coherent judgment is a cardinal feature of rational cognition. Six experiments revealed systematic violations of coherence in probability judgment in which participants assigned different probabilities to equiprobable binomial outcomes. Experiments 1-5 revealed a strict refocusing effect: Compared to an occurrence frame, a non-occurrence frame resulted in higher estimates if base-rate evidence favored occurrence, lower estimates if evidence favored non-occurrence, and similar estimates if evidence supported indifference. Moreover, Experiments 5 and 6 revealed an overpessimism effect: Among equiprobable outcomes, singular successes were judged more probable than multiple successes, but the opposite

was true for failures. The findings support a representational-assessment processes account in which subjective probability is influenced by the perceived compatibility between representations of focal outcomes and representations of evidence.

2 - A Multistage Influence Diagram Game for Maneuvering Decisions in Air Combat

Kai Virtanen, Researcher, Dr., Systems Analysis Laboratory, Helsinki Univ. of Technology, P.O. Box 1100, FIN 02015 HUT, Espoo, Finland, kai.virtanen@hut.fi, Raimo P. Hämmäläinen, Tuomas Raivio

We introduce a multistage influence diagram game for modeling the maneuvering decisions of pilots in air combat. It contains a model for the dynamics of the aircraft and takes into account the pilots' preferences under uncertainty. Game optimal controls are obtained by solving the game with a moving horizon control approach. To demonstrate the influence diagram game and its aspects, examples with a three-dimensional point mass aircraft model are analyzed.

3 - Coalition Formation in Supply Networks

Jayavel Sounderbandian, Interim Dean, School of Business and Technology, University of Wisconsin - Parkside, 900 Wood Road, Kenosha, WI, 53144, Sounderp@uwp.edu

Define a supply network as a directed graph where nodes represent materials that are raw, semi-finished or finished, and the directed branches are firms that can convert the materials represented by the beginning node into materials represented by the end node. Other parameters such as capacity and cost of conversion are attached to each branch. A company is defined as a set of firms owned by the company. A supply chain is formed when a set of companies in the supply network form a partnership so that the firms belonging to the companies are able to complete a supply chain from raw materials to finished goods. This paper analyzes the strategies that companies can adopt to form competent supply chains.

TC09

S-Ming I

Scheduling, Planning, and Outsourcing

Cluster: Scheduling

Invited Session

Chair: Zhi-Long Chen, Robert H. Smith School of Business, University of Maryland, College Park, MD, 20742, zchen@rhsmith.umd.edu

Co-Chair: Lei Lei, Associate Professor, Rutgers University, MSIS Department, 180 University Avenue, Newark, NJ, 07102, United States, llei@andromeda.rutgers.edu

1 - Container Vessel Scheduling with Bi-directional Flows

Lei Lei, Associate Professor, Rutgers University, MSIS Department, 180 University Avenue, Newark, NJ, 07102, United States, llei@andromeda.rutgers.edu, Zhi-Long Chen, Hua Zhong

We consider the problem of scheduling container vessels between an origin port and a destination port at minimum transportation and inventory cost over a given planning horizon. In each time period, both a forward flow demand (from origin to destination) and a reverse flow demand need to be handled subject to some practical constraints. We prove the NP-hardness of the problem and then derive two theoretical results, which lead to a fast heuristic with a near optimal solution quality.

2 - Managing Partially Controllable Raw Material Acquisition and Outsourcing in Production Planning

Jian Yang, Assistant Professor, New Jersey Institute of Technology, Dept. of Ind. & Manu. Engineering, College of Engineering, Newark, NJ, 07102, United States, yang@adm.njit.edu, Xiangtong Qi

We study a production planning problem involving internal supply of raw material, raw material acquisition, and outsourcing. We study the problem under various assumptions. For the concave-cost case, we present polynomial algorithms for some situations and show the NP-hardness of the problem for others.

3 - A Greedy Algorithm for Large-Scale Supply Chain Network Design and Optimization

Jia Shu, Jiawei Zhang

We consider a multi-echelon supply chain network design and optimization problem that simultaneously makes the location, distribution, and warehouse-retailer echelon inventory replenishment decisions. We propose a greedy algorithm and prove its performance guarantee. Computational results indicate that our algorithm can solve large-scale problems efficiently and effectively.

4 - Scheduling with Subcontracting Options

Zhi-Long Chen, Robert H. Smith School of Business, University of Maryland, College Park, MD, 20742, zchen@rhsmith.umd.edu, Chung-Lun Li

We study an integrated production scheduling and subcontracting model with the objective of optimizing a performance measure involving both the total production and subcontracting cost and order delivery lead times. We design solution algorithms for the problems and derive related managerial insights.

TC10

S-Ming I

Integer Programming and Applications

Cluster: Discrete and Combinatorial Optimization

Invited Session

Chair: Chuangyin Dang, Associate Professor, City University of Hong Kong, 83 Tat Chee Avenue, Kowloon, HK, Hong Kong, mecdang@cityu.edu.hk

1 - Approximation Algorithms for Facility Location Problems with Concave Cost

Jiawei Zhang, Assistant Professor, New York University, jzhang@stern.nyu.edu

We consider facility location problems where the facility cost is a concave function of the total demand served by the facility. When each client has one unit of demand, it is known that this problem admits a 1.52-approximation by reducing it to the uncapacitated facility location problem. In this paper, we present greedy algorithms for the problem with arbitrary demand and show that they have constant performance guarantees.

2 - A Mixed Particle Swarm Optimization Algorithm for Vehicle Routing Problem with Time Windows

Chengxiu Gao, Professor, Wuhan University, China, School of Mathematics & Statistics, Wuhan, Hu, 430072, China, cxgao@whu.edu.cn, Fang Wang, Haili Ding

This paper introduces the particle swarm optimization (PSO) to deal with the vehicle routing problem with time windows (VRPTW). According to the model of this problem and the traits of PSO, we set up the PSO algorithm by combining with the genetic algorithm. Experimental results indicate that this mixed particle swarm optimization algorithm can effectively and rapidly get an optimal solution of VRPTW. * Supported by NSFCE(r)A0324666E70471034E(c), "985" Project (105204200400012))

3 - Solving a Multi-objective Job Shop Scheduling Problem

Ping Ji, Associate Professor, Hong Kong Polytechnic University, mfpji@polyu.edu.hk

In this talk, the problem of scheduling a set of n jobs on m machines in a job shop environment, with the objective of seeking the minimum production idle time and minimum tardiness and earliness penalties of jobs, is addressed. A mixed integer programming (MIP) model is developed in order to obtain optimal solutions for the multi-objective job shop scheduling problem. The mathematical model is verified with a commercial software package and tested with an example.

TC11

S-Boardroom

Power System Research in Asia-Pacific Region

Sponsor: Energy, Natural Resources and the Environment

Sponsored Session

Chair: Fushuan Wen, Professor, Guangzhou, China, fushuan.wen@gmail.com

1 - State-of-the-Art and Prospect of Power Industry Restructuring in China

Fushuan Wen, Professor, Guangzhou, China, fushuan.wen@gmail.com, Xueshun Zhao, K.P. Wong, C.Y. Chung

At first, a brief introduction about the power industry in China is given, including total generation installed capacity in the years from 1952 through 2004, annual increase ratio of new generation installed capacity from 1978 to 2004, comparison between the increase ratios of generation installed capacity and generation quantity from 1978 to 2004, and elasticity of electricity consumption. Then, a brief review of the power industry restructuring in China and a prospect of the restructuring efforts to be carried out in the next few years are made. Existing and potential challenges and obstacles in the restructuring procedure are highlighted.

2 - Evaluating the Relative Efficiency of the Taiwan Power Company by Hierarchical Bayesian Neural Net

Chun Yuan Yu, PhD Student, National Chiao Tung University, 4F No.118, Sec.1, Chung-Hsiao W. R.d., Taipei, Taiwan, bacteria0724@hotmail., Chih-Chou Chiu, Chih Yi Liaw, Shin-Ying Hwang

In power delivery, how to conduct an efficiency measurement is an important task. In this paper, a hierarchical Bayesian neural network is proposed to find a stochastic frontier (SF). The goal to setup the hierarchical model is to check if the heterogeneity across electricity distribution districts (EDD) exists. To demonstrate the effectiveness of the proposed model, 22 EDD of the Taiwan Power Company were applied. The results show that our proposed model can make an effective estimate of SF.

3 - Calibrating a Cournot Model to Forecast Australian Electricity Prices

James Tipping, PhD Student, Department of Management, University of Canterbury, Private Bag 4800, Christchurch, New Zealand, jpt34@student.canterbury.ac.nz, Grant Read, Debabrata Chattopadhyay, Don McNickle

For many years, Cournot models have been used to simulate the operation of hypothetical electricity markets. However, very little work has been undertaken in discovering how closely these models mimic actual market behaviour. Calibrating these models by tuning the elasticity of demand and the contract level, so that they reproduce the price behaviour that actually occurs in real markets, greatly increases the credibility of these models for future application.

TC12

S-Celestial Court-Jade

Intelligent System Design and Management

Contributed Session

Chair: Miri Weiss-Cohen, Dr., Braude College of Eng., Pob 78, Karmiel, 21982, Israel, mweiss@ort.org.il

1 - A Fabric Texture Inspection Method using the Gabor Filter

Chih-Hao Lin, student, Department of Industrial Engineering and Management, I-Shou University, No. 1, Sec. 1, Syuecheng Rd., Dashu Town, Kaohsiung, Taiwan, jacky223@ms12.url.com.tw, Wen-Yen Wu

In this paper, we use the optimal Gabor filter to the inspection of fabric texture. The optimal Gabor filter is composed by the concept of Gaussian function and exponential function, which includes three parameters: bandwidth, frequency, and orientation. The new parameters of the optimal Gabor filter are found to be useful in detecting the defects in the fabric texture, and the experimental results show that the proposed method is effectively.

2 - Design and Implementation of an Interactive Bargaining Agent for Cyber Commerce

Chia-Jung Hu, Southern Taiwan University of Technology, No. 1, Nan-Tai St., Yung-Kang, T, Taiwan, z9z@mail.stut.edu.tw, Ming-Yuan Shieh, Jeng-Han Li

This paper proposes an interactive bargaining agent system for cyber commerce. The negotiatory agent aims to provide consumers a real shopping environment in internet for increasing success rates of bargains. It is designed not only taking account of consumers' standpoint on price but also minding the operating cost of the seller. Some efficient strategies will be concluded from a GA-based fuzzy inference system. Real cases of bargains will demonstrate the feasibility.

3 - A Multi-Agent Approach for Optimizing Queries with Foreign Functions

S.M. Jaisakthi, Dept of Computer Science and Engineering, SSN College of Engineering,, Chennai, India, N. S. Gowri Ganesh

Foreign functions are those functions, which reside in a remote site, and can be called from any local site and executed in the remote site and the result can be returned to the local site. These foreign functions are cost consuming and care should be taken in order to reduce the same. So far, queries with foreign functions have been optimized only by using heuristic algorithm. The explosive growth of the "intelligent Agents" can be applied for optimizing the queries with foreign functions. In this paper mobile agents are applied and an efficient algorithm for reducing the cost of query execution has been proposed. The concept of mobile agents is utilized in this project to reduce the response time. Concurrent execution of the agents help in reducing the response time.

4 - Solid Forms Reconstruction from Orthographic Views

Miri Weiss-Cohen, Dr., Braude College of Eng., Pob 78, Karmiel, 21982, Israel, mweiss@ort.org.il

The approach presented an automatic procedure for 3D object reconstruction from 2D engineering drawings which mimics skilled human intelligence. Combining elements of variational geometry, matrix algebra and graph theoretic methods, the approach incorporates high level understanding of 2D engineering drawings, topological relations and dimensional scheme analysis for each 2D view. The dimensioning schemes of each view are merged into a common dimensioning scheme of the entire object.

TC13

S-Celestial Court-Pearl

Product Life Cycle Management

Contributed Session

Chair: Arif Rana, Associate Professor, Lahore University of Management Sciences, DHA, Lahore, 54792, Pakistan, arif@lums.edu.pk

1 - Broadening the Scope of PLM System for Implementation in Global Environment

Guiping Hu, PhD Candidate, Univeristy of Pittsburgh, 1048 Benedum Hall, University of Pittsburgh, Pittsburgh, PA, 15261, United States, guh5@pitt.edu, Yan Wang, Bopaya Bidanda

In today's world, products are designed, manufactured, distributed across multiple boundaries. The implementation of Product Lifecycle Management (PLM) has drawn much attention in both industry and academia. This research broadens the scope of PLM systems, proposes research issues, and identifies challenges on culture gaps, multiple standards and customization in the global arena. In addition, we apply stochastic dynamic programming methodology to model the whole product life cycle and make suggestions for development of the next generation cost-effective PLM systems.

2 - Product Line and Licensing Strategies under Complementary Effects

Xiaohui Xu, California State Polytechnic University, 2840 S. Diamond Bar #48, Diamond Bar, United States, xxu@csupomona.edu, Stephen Gilbert

In this study, we investigate the product line strategy under complementarities. If the product is differentiated, a monopolist under strong enough complementary effects would provide a broader product line than he would if the demand for his product was independent of other markets. In addition, we show that providing a broader product line and technology licensing are strategic complements.

3 - A Proposal of Modular Design Concepts and its Supply Chain

Satoshi Watanabe, Waseda Univeristy, 2-7 Hibikino Wakamatsuku, Kitakyushu, 8080135, Japan, s-watanabe@suou.waseda.jp, Mikihiko Muraio, Koudai Aman, Fukuya Ishino

The supply chain mechanisms should be taking into consideration to create a new product value by parts replacement. The study is focused on lifetime dependent module design, instead of focusing on functional module design found in most existing products. Changes in logistics and customers are discussed based on changes in the concept of inventory. Some empirical approaches for those products are shown.

4 - A Two-Dimensional Supply Chain Life-Cycle Management Framework For the Automobile Industry

Ahmed Ispahani, Professor, University of La Verne, 1950 Third Street, Upland, CA, 91750, United States, ispahani@ulv.edu, Yehia Mortagy, Linda Gordon, David Kung

This paper presents a framework for the automobile industry to analyze its Information Technology efforts along the supply chain life-cycle. First dimension includes both product and logistics related activities from product design to production to logistics. Second dimension addresses product and supply chain specific types of characteristics, including the bitability, modularity, and information intensity, cost structure, and vertical collaboration or standardization opportunities.

5 - Supply Chain Management Practices and the Health of the Small and Medium Enterprises in Pakistan

Arif Rana, Associate Professor, Lahore University of Management Sciences, DHA, Lahore, 54792, Pakistan, arif@lums.edu.pk, Khurruhm Bhutta

A survey of 651 Small and Medium Enterprises was conducted in 2003, to gauge the performance of the SMEs as well as their supply chain related management practices. The analysis shows that SMEs into exports were the "healthiest" and exhibited most "dynamic" characteristics, followed by those that sold to OEMs. Another interesting insight is that "growing" firms sold more directly to end users while firms with higher sales per employee sold the least directly to the end user.

TC14

S-Celestial Court-Coral

Health Care Policy Modelling

Cluster: Health Applications - Joint Invited/Sponsored

Chair: Marion Rauner, University of Vienna, Dept. of Innovation & Technology Mgmt., Bruenner Str. 72, Vienna, Austria, marion.rauner@univie.ac.at

1 - Modelling the Spread of HCV via Tattoo Parlours: Implications for Public Health Interventions

Marion Rauner, University of Vienna, Dept. of Innovation & Technology Mgmt., Bruenner Str. 72, Vienna, Austria, marion.rauner@univie.ac.at, Jonathan Caulkins, Doris Behrens

Hepatitis C (HCV) is a contagious disease spreading rapidly via a variety of transmission mechanisms including contaminated tattoo equipment. This paper models the cost-effectiveness and optimal timing of regulation strategies for commercial tattoo parlours, and parameterizes the model with data for Vienna, Austria. This dynamic model of the contagious spread of HCV via tattooing and other mechanisms accounts for secondary infections and shows that regulation can be highly cost-effective.

2 - Stochastic Models for Operating Room Planning

Xiaolan Xie, Professor, Ecole des Mines de Saint Etienne, 158 cours Fauriel, Saint Etienne, 42023, France, xie@emse.fr

This paper addresses an operating rooms (ORs) planning problem which consists in planning elective cases in order to minimize the sum of elective patients related costs and overtime costs of ORs by taking into account randomly arriving emergency cases. We propose an optimization method combining Monte Carlo simulation and Mixed Integer Programming. Various convergence properties are established. Numerical results show that important gain can be realized by using stochastic ORs planning model.

3 - Simulation-based Optimization Approach for Organ Transplantation Region Design

Nan Kong, Assistant Professor, University of South Florida, 4202 E. Fowler Ave, ENB 118, Tampa, FL, 33613, United States, kong@eng.usf.edu, Patricio Rocha, Gabriel Zayas-Caban

How to allocate organs for transplantation has been controversial in the U.S. for decades. A three-tier hierarchical allocation system has been recently implemented, which divides the country into 11 regions, composed of 59 OPOs. However, the question of which regional configuration is the best remains unanswered. To find the optimal regional configuration, considering both efficiency and equity, a model will be developed to integrate metaheuristics with a clinically based simulation.

4 - The "COREmain Hospital" Game: Implications for Teaching, Research, and Policy Making

Markus Kraus, Research Assistant, Institute for Advanced Studies, Stumpergasse 56, Vienna, A-1060, Austria, markus-kraus@aon.at, Joerg Gesslbauer, Sigrun Schwarz, Marion Rauner

We have developed a web-based hospital management game to illustrate the economic and organizational decision making process in a hospital for students, researchers, and policy makers. Using discrete event simulation, we have modelled the care and treatment of different patient categories. The hospitals compete against each other for patients and budget depending on their mission, the regional health policy, the inpatient reimbursement system as well as the job and radiology technology market.

TC15

S-Celestial Court-Amber

Economic Modeling

Contributed Session

Chair: Takashi Matsuhisa, Professor, Ibaraki National College of Technology, Nakane 866, Hitachinaka-shi, Ibaraki, 310-0033, Japan, mathisa@ge.ibaraki-ct.ac.jp

1 - Input-Output Projected-Gradient Approach to Finding Optimal Structural Change in Economic Systems

Alexander Vaninsky, Assistant Professor, Hostos Community College, CUNY, 500 Grand Concourse, Mathematics Dept., Rm B-409, Bronx, NY, 10451, United States, avaninsky@hostos.cuny.edu

Method of finding locally optimal structural change in economic systems described by input - output models and aimed at maximization of final product per capita is suggested. The method is based on finding projected-gradient and making proposed structural change accordingly. The components of projected-gradient and corresponding locally optimal structural change are obtained in explicit form. Economy of Japan is considered as an example.

2 - Systems of Taxations as a Some Class of Hierarchical Games

Alexey Sadovski, Professor of Mathematics, Texas A&M University-Corpus Christi, 6300 Ocean Dr., Corpus Christi, TX, 78412, United States, sadovski@falcon.tamucc.edu

The paper deals with two-level hierarchical games: government as the center and different social groups as the lower level players. The equilibrium (consensus) solution is found, which depends on the amount of wealth and the interests of the achieving common goals of the society as a whole.

3 - Modeling of Relations in Network Economy

Petr Fiala, Professor, University of Economics Prague, W. Churchill Sq. 4, 130 67 Prague 3, Czech Republic, pfiala@vse.cz

The network economy is a term for today's global relationship among economic subjects characterized by massive connectivity. A variety of feedback processes create complex system behavior. The aim of the paper is to present models and computational frameworks to address new opportunities in network connections of different economic units. Significant factors for network models comprise: network structure, dynamic environment, uncertainty environment, multiple decision units with multiple goals.

4 - Scale Functions in Equilibrium Selection in Games

Madjid Amir, Assistant Professor, Sultan Qaboos University, Department of Mathematics and Statistics, P.O. Box 36, Muscat, 123, Oman, madjid_amir@yahoo.com, Siegfried Berninghaus

We address the issue of equilibrium selection in an evolutionary game model, working with the scale function of a diffusion process. We justifiably assume that in this evolutionary game model with mutation, the boundaries of the solution of a stochastic differential equation are absorbing so that the first boundary of the interval [0,1] hit will determine the equilibrium selected. Theoretical results are obtained for 2x2 symmetric games and numerical methods are used for more general games.

5 - Core Equivalence for Economy on Belief II

Takashi Matsuhisa, Professor, Ibaraki National College of Technology, Nakane 866, Hitachinaka-shi, Ibaraki, 310-0033, Japan, mathisa@ge.ibaraki-ct.ac.jp

We reconsider the core equivalence theorem in an exchange economy under uncertainty from modal-logical point of view, where the traders have the logic of belief with non partition structure. By introducing the extended notion, an economy on belief, we show some verifications of the theorem different from previous works for the economy under asymmetric information. We especially re-examine the relationship between the interim core and the expectations equilibria in the extended economy.

TC16

S-Celestial Court Amethyst

Industry Applications I

Contributed Session

Chair: Jae Hyung Min, Professor, Sogang University, School of Business, C.P.O. Box 1142, Seoul, 121-742, South Korea, jaemin@sogang.ac.kr

1 - Methodology for Indicators DEA of Efficiency, for the Extension in the National University of Colombia

Gloria Isabel Rodríguez Lozano, National University of Colombia, girodriguez@unal.edu.co, F.J. Arcelus

The few indicators that itself tried to develop for this type of activities in Colombia, have been always classical indicators, of such way that itself cannot come establish with clarity an unique measure of efficiency that relate all that central that are dedicated to advance the different modalities of extension inside National University of Colombia.

2 - Study of The Efficiency of 3 Sectors of the Colombian Economy Using DEA

Gloria Isabel Rodríguez Lozano, National University of Colombia, girodriguez@unal.edu.co

In this investigation studies three sectors of the colombian economy: feeding products, chemistry products and commercial cars, for years 1998 to 2004. Using four inputs and two outputs. Establishing the indicators of efficiency for each one of the companies.

3 - Management Science Applications in Korean Financial Institutions: A Sample View

Jae Hyung Min, Professor, Sogang University, School of Business, C.P.O. Box 1142, Seoul, 121-742, South Korea, jaemin@sogang.ac.kr

This study reports the results of a recent survey on the application of management science in Korean financial institutions, and discusses challenges and opportunities they face. Specifically, we present their current status of management science practice and the main obstacles to successful management science implementation they perceive among others.

■ TC17

H-Crystal Room 1

Container Handling

Sponsor: Transportation Science & Logistics
Sponsored Session

Chair: Yat-wah Wan, Associate Professor, National Dong Hwa University, Institute of Global Operations Strategy, Shou-Feng, Hualien, TW, 974, Taiwan, ywan@mail.ndhu.edu.tw

1 - Cargo Flow Optimization in Terminal Network

Dongsheng Xu, PhD Student, Dept. of Industrial Engineering & Logistics Management, Hong Kong University of Science and Technology, 303a, Tower A, HKUST, Clear Water Bay, Kowloon, Hong Kong, Hong Kong, xuds@ust.hk, Raymond Cheung

We consider cargo flow optimization problems in the terminal network. Computational analysis is conducted by proving the NP-hardness. We propose a flow diversion control scheme, where at each node the flow is diversified into outflow arcs by controlling Variables. Several optimality properties are studied and an adaptive strategy is proposed. Numerical experiments are conducted in practical-sized simulation to compare the effectiveness of our approach and the existing ones in the literature.

2 - Cross Border Container Handling Problem

Ning Shi, Department of Industrial Engineering and Logistics Management, Hong Kong University of Science and Technology, shining@ust.hk, Raymond Cheung

Using Hong Kong as an example, we illustrate the challenges and issues on cross border container handling activities. One major challenge comes from the various level of policy restriction. We formulate this problem by a general attribute-decision making model which has particular flexibility to handle different situations. We further propose an efficient algorithm to solve this problem and evaluate how the policies influence the cargo handling efficiency.

3 - Flow Diversion Approaches for Automated Container Handling Systems

Allen Lee, Department of Industrial Engineering and Logistics Management - Hong Kong University of Science and Technology, allenlee@ust.hk, Gil Law, Raymond Cheung, Daniel Mo

The automated container handling systems in large freight terminals and distribution centers are complex and are increasingly congested due to the increase of freight volume. Optimization-based tactical and operational planning models and methods for how to route the containers through the large network of equipment are required for reducing the transit time. This paper studies a static and an adaptive flow diversion approaches for routing containers from origins to destinations.

4 - On the Storage Locations of Containers in a Container Stack

Yat-wah Wan, Associate Professor, National Dong Hwa University, Institute of Global Operations Strategy, Shou-Feng, Hualien, TW, 974, Taiwan, ywan@mail.ndhu.edu.tw, Jiyin Liu, Pei-Jyun Cai

The determination of container storage locations is a basic task of a container terminal, and a computationally hard one too. We study the problem at the stack level where there are dynamic storage and retrieval of containers. Our method is based on integer programs embedded in a rolling horizon. The method also sheds light on different storage policies.

■ TC18

H-Crystal Room 2

Location Modes for Problems in the Public Domain

Sponsor: Location Analysis
Sponsored Session

Chair: Vedat Verter, Professor, McGill University, 1001 Sherbrooke St. W., Montreal, QC, H3A 1G5, Canada, vedat.verter@mcgill.ca

1 - Locating Collection Centers With Distance and Incentive Dependent Returns

Necati Aras, Associate Professor, Bogazici University, Bebek, Istanbul, Turkey, arasn@boun.edu.tr, Deniz Aksent

We address the problem of locating collection centers faced by a company collecting used products. Product holders travel to the collection centers for returning their goods. Each product holder has an inherent willingness to return and makes the decision on the basis of the financial incentive offered and the proximity to the nearest center. We determine both the optimal locations of the collection centers and the optimal value of the incentive so as to maximize the profit from the returns.

2 - Dynamic Capacity Planning and Location of Service Facilities

Joseph Mazzola, Professor, Georgetown University, mazzolaj@georgetown.edu, Alan Neebe

Capacity planning and location of service facilities must incorporate dynamic

factors such as the adoption of new technologies, infrastructure obsolescence, and the constantly changing requirements of customer service. We propose models for dynamic service-facility capacity planning and discuss algorithms for solving them. Computational experience is also presented.

3 - Continuous Approximation of Discrete Demand Data for Location-Allocation Models

Vedat Verter, Professor, McGill University, 1001 Sherbrooke St. W., Montreal, QC, H3A 1G5, Canada, vedat.verter@mcgill.ca, Alper Murat

When the demand data set is large, aggregation technique is the first line of defense for location-allocation models. This method is especially preferred for discrete models and solution methodologies. In this study, we computationally investigate the effect the opposite approach, namely disaggregating discrete demand data via continuous surface functions.

4 - Incorporating Congestion in Designing Preventive Healthcare Facility Networks

Vedat Verter, Professor, McGill University, 1001 Sherbrooke St. W., Montreal, QC, H3A 1G5, Canada, vedat.verter@mcgill.ca, Yue Zhang, Oded Berman

This paper provides a model and a solution procedure for the problem of locating an undetermined number of preventive healthcare facilities so as to maximize participation. Each congested facility is assumed as an M/M/1 queue, and each customer would only patronize the closest preventive health care facility. Four heuristics are proposed and compared on accuracy and computational performance.

■ TC19

H-Crystal Room 3

Web Services and Application Builders for Optimization

Cluster: Web-Service Related Technology
Invited Session

Chair: Robert Fourer, Professor, Northwestern University, Dept. of Industrial Eng & Mgmt Sciences, 2145 Sheridan Road, Evanston, IL, 60208-3119, United States, 4er@iems.northwestern.edu

1 - Generating Optimization Applications Automatically from Model Structure

Gregory Glockner, Technical Account Manager, ILOG, Inc., 1080 Linda Vista Avenue, Mountain View, CA, 94043, United States, gglockner@ilog.com

The connector between ILOG OPL and ODM allows push-button generation of a customizable ODM application from the structure of an OPL model. The OPL model is not embedded as a black box. On the contrary, the model's structure (data, constraints, objective functions) results in interactive displays of ODM input data, solution views, business goals and relaxable constraints. We discuss how these business concepts are mapped to the underlying mathematical elements, during development and at runtime.

2 - Using the MPL Modeling System and OptiMax 2000 to Create Embedded Optimization Applications

Bjarni Kristjansson, Maximal Software, bjarni@maximalsoftware.com

MPL is a modeling language that allows the model developer to efficiently formulate complicated optimization models. We will demonstrate advanced indexing and data modeling techniques that are used to provide the speed and scalability required to solve large-scale models with millions of variables and constraints. We will also demonstrate how the OptiMax 2000 Component Library can be used to embed MPL models in customized end-user applications to solve real-world optimization problems.

3 - Optimization via the Internet: NEOS 5 and Beyond

Robert Fourer, Professor, Northwestern University, Dept. of Industrial Eng & Mgmt Sciences, 2145 Sheridan Road, Evanston, IL, 60208-3119, United States, 4er@iems.northwestern.edu, Jorge Moré, Todd Munson, Jason Sarich

The NEOS Server provides free net access to nearly 50 "solvers" of optimization problems via a variety of interfaces and languages. It handles 3000-6000 requests a week and features a distributed design that scales readily. This survey emphasizes ideas behind the latest, completely rewritten version, and offers a look at upcoming developments: automated problem analysis, modern forms for optimization problem instances, and an Optimization Services framework based on new web-service standards.

■ TC20

H-Jade Suite 1

Methods in Artificial Intelligence

Contributed Session

Chair: He Bin, Ehime universtiy, Hatatera 1-7-38-2-232,790-0913, Matsuyama, Japan, hebin@agr.ehime-u.ac.jp

1 - Error-bounded Curve Segmentation using Ant Colony Algorithm

Yu-Ting Chang, Student, I-Shou University, No. 1, Sec. 1, Syuecheng Rd., Dashu Town, Kaohsiung, Taiwan, m9420006@stmail.isu.edu.tw, Ming-Shun Cheng, Wen-Yen Wu

In this paper, we propose a curve segmentation method using the ant colony algorithm. Ant colony optimal algorithm has been successfully utilized in the curve segmentation. However, the hybrid strategy is time consuming. A method which combines the concept of corner detection as well as the error-bounded constraint is used to segment the curves. The experimental results show that the proposed method is effectively and it takes less time than previous method.

2 - Identification of Suspicious Activities using Kalman Filter

Najeed Khan, Assistant Professor, NED University of Engineering & Technology, Department of Computer Science & IT, Karachi, Pakistan, najeed@hotmail.com

We present a system for real time detection of moving objects and predict their activity on identifying features of dynamic objects. The system captures video of a scene, segments it and identifies moving object(s) by subtracting static objects. The system first segments video frame using descriptors for identifying the dynamic objects from image sequence, then the system uses Kalman filter and predicts the next movement of the object of interest if it involves any suspicious activity.

3 - Modeling Doubtful Information in Evidential Reasoning: Confirmatory Hints and Meta-Hints

Hans Wolfgang Brachinger, Professor, University of Fribourg, Perolles 90, Fribourg, CH-1700, Switzerland, Hanswolfgang.Brachinger@unifr.ch

The problem treated in this paper is how to construct a logical reasoning if incomplete and ambiguous information is confirmed or disconfirmed by other pieces of information and how to combine such information even in the case of contradiction. Based on the mathematical theory of hints two new kinds of hints, confirmatory hints and meta-hints, are proposed. Starting from Dempster's well-known rule of combination a new operation for combining the various kinds of information is developed.

4 - Research on Multi-agent-based Collaborative Planning, Forecasting and Replenishment

Chen Yiming, Associate Professor, Changsha University of Science and Technology, Changsha, 410076, China, cymoil@sina.com

Intelligent Agent Technology(IAT) is used in Collaborative Planning, Forecasting and Replenishment(CPFR).Corresponding agents are built and a typical workflow model of Multi-agent-based Collaborative Planning, Forecasting and Replenishment system is presented. The working mechanism of Multi-agent-based Collaborative Planning, Forecasting and Replenishment system is presented.

5 - Simulating River Chemical Mass Transport by Artificial Neural Network Model

He Bin, Ehime universtiy, Hatatera 1-7-38-2-232,790-0913, Matsuyama, Japan, hebin@agr.ehime-u.ac.jp, Wang Yi, Keiji Takase, Osamu Kaino

The problems of an adequate understanding and description of complex processes of pollutant circulation and water quality dynamics in rivers can be effectively solved by applying the artificial neural network model. This paper presents the results of a study that examined the application of this model to simulate the river chemical mass transport using the indicator of dissolved oxygen which is an important measure of the free available oxygen within water body.

■ TC21

H-Jade Suite 2

New Frontiers of Combinatorial Optimization

Cluster: Special Sessions

Invited Session

Chair: Shigeru Masuyama, Department of Knowledge-Based Information Engineering Toyohashi University of Technology, Toyohashi, 441-8580, Japan, masuyama@tutkie.tut.ac.jp

1 - A Polynomial Time Algorithm for Obtaining the Minimum Vertex Ranking Spanning Tree on Outerplanar Graphs

Shin-ichi Nakayama, Department of Mathematical Sciences, Faculty of Integrated Arts and Sciences, The University of Tokushima, Tokushima, 770-8502, Japan, shin@ias.tokushima-u.ac.jp, Shigeru Masuyama

The minimum vertex ranking spanning tree problem is to find a spanning tree of G whose vertex ranking is minimum. This paper proposes a polynomial time algorithm for solving the minimum vertex ranking spanning tree problem on outerplanar graphs.

2 - Augmenting Cacti to Meet Diameter Requirements

Toshimasa Ishii, Department of Information and Management Science, Otaru University of Commerce, 3-5-21 Midori, Otaru, 047-8501, Japan, ishii@res.otaru-uc.ac.jp, Masahiro Ohshita

Given an undirected graph G and an integer D , we consider the problem of augmenting G by the smallest number of new edges so that the diameter becomes at most D . It is known that there is no polynomial time constant approximation algorithm to this problem unless $P=NP$. We show that for cacti, the problem is approximable within a constant factor in polynomial time.

3 - A Guided Local Search Algorithm Based on a Fast Neighborhood Search for the Irregular Strip Packing Problem

Shunji Umetani, The University of Electro-Communications, 1-5-1 Chofugaoka, Chofu, Tokyo 182-8585, Japan, umetani@se.uec.ac.jp, Takashi Imamichi, Mutsunori Yagiura, Shinji Imahori, Nonobe Koji, Toshihide Ibaraki

The irregular strip packing problem is to pack given polygons without overlap in the strip. We propose a guided local search algorithm based on a fast neighborhood search.

Tuesday, 3:30pm - 5:00pm

■ TD01

S-Tang II

Quality and Reliability

Cluster: Quality, Statistics and Reliability - Joint Invited/Sponsored

Chair: S. T. Tseng, Professor, National Tsing-Hua University, 101 Section 2 Kung-Fu Road, Hsin-Chu, TW, 30043, Taiwan, sttseng@stat.nthu.edu.tw

1 - Models for Accelerated Degradation Test

Shuen-Lin Jeng, Associate Professor, Dept. of Statistics, Tunghai University, No 181, Sec. 3, Taichung-Kan Rd., Taichung, Taiwan, sljeng@mail.thu.edu.tw

Three models for accelerated degradation test will be introduced in this talk. They are accelerated life test method with pseudo failure times, parametric nonlinear mixed effect model and semi-parametric nonlinear random effect model. A set of data from integrated circuit power drop is used to demonstrate the estimation results and the confidence intervals of cdf in normal usage level. Simulations are conducted to compare the finite sample properties of these models.

2 - Investigation of Properties on the Discount Factors of Some variations of Double EWMA Controllers

S. T. Tseng, Professor, National Tsing-Hua University, 101 Section 2 Kung-Fu Road, Hsin-Chu, TW, 30043, Taiwan, sttseng@stat.nthu.edu.tw, Wheyming Song, Yu-Chi Chang

The double exponentially weighted moving average (dEWMA) controller is a popular run-to-run controller for a drifted process. The performance of a dEWMA controller is affected by the choice of the discount factors. The time-varying weights tuning method of the dEWMA (for simplicity, noted as the TVWT controller in this paper) and the initial intercept iteratively adjusted (IIIA) controllers are two revised dEWMA controllers. We study the properties on the discount factors of traditional dEMA, TVWT, and IIIA controllers. A strategy on choosing the discount factors is also discussed in this paper. The double exponentially weighted moving average (dEWMA) controller is a popular run-to-run controller for a drifted process. The performance of a dEWMA controller is affected by the choice of the discount factors. The time-varying weights tuning

method of the dEWMA (for simplicity, noted as the TVWT controller in this paper) and the initial intercept iteratively adjusted (IIIA) controllers are two revised dEWMA controllers. We study the properties on the discount factors of traditional dEMA, TVWT, and IIIA controllers. A strategy on choosing the discount factors is also discussed in this paper.

3 - Designing a Stable EWMA Controller under Dynamic Systems

S. T. Tseng, Professor, National Tsing-Hua University, 101 Section 2 Kung-Fu Road, Hsin-Chu, TW, 30043, Taiwan, stseng@stat.nthu.edu.tw

EWMA feedback controller is a popular R2R controller which primarily uses data from past process to adjust settings for the next run. In this talk, under two well-known dynamic models, we investigate the stability conditions of a EWMA controller. By controlling a guaranteed probability of stability, we derive a formula for the adequate sample size required to construct a predicted model.

TD02

S-Tang I

AI, Data Mining, and Decision Making

Cluster: Artificial Intelligence, ES and Neural Networks
Invited Session

Chair: Guo-Hshung Tzeng, Distinguished Chair Professor, Department of Business Administration, Kainan University, No. 1 Kainan Rd., Luchu, Luchu, tw, 338, Taiwan, ghtzeng@mail.knu.edu.tw

1 - An Adaptive Genetic Clustering Method for Exploratory Mining of Feature Vectors and Time Series

T Warren Liao, Professor, Louisiana State University, 3128 CEBA, Baton Rouge, LA, 70803, United States, ieliao@lsu.edu, Pei-Chann Chang

An adaptive genetic algorithm that is capable of clustering feature vectors as well as time series data will be presented. Some test results in terms of clustering accuracy and identified number of clusters by several validity-index-based fitness functions are discussed.

2 - Integration of Clustering Analysis and Ant Colony System for Mining Association Rules

R. J. Kuo, Professor and Dean, National Taipei University of Technology, #1 Chung-Shao East Road Section 3, Taipei, 106, Taiwan, rjkuo@ntut.edu.tw

This study intends to propose a two-stage method for mining association rules. In the first stage, the data provided by the Bureau of National Health Insurance of Taiwan Government is clustered via self-organizing feature map neural network, while the second stage employs ant colony system to mine the association rules for each cluster. The evaluation results showed that the proposed framework is able to find more useful association rules as well as reduce the computational time.

TD03

S-Ballroom A

Marketing Science

Sponsor: Marketing Science
Sponsored Session

Chair: Mark Uncles, Professor, University of New South Wales, School of Marketing, Sydney, NS, 2052, Australia, m.uncles@unsw.edu.au

Co-Chair: Kristiaan Helsen,, Hong Kong Univ of Science & Technology, Dept. of Marketing, Clear Water Bay, Hong Kong, SK, Hong Kong, mkhel@ust.hk

1 - Using the Generalized Dirichlet Model to Examine the Purchasing Behavior of Shanghai Consumers

Mark Uncles, Professor, University of New South Wales, School of Marketing, Sydney, NS, 2052, Australia, m.uncles@unsw.edu.au, Stephanie Huang, Simon Kwok, Cam Rungie

The effects of covariates on Brand Performance Measures (BPMs) are examined using the Generalized Dirichlet Model. The impact of covariates on both the NBD (category) and DMD (brand choice) levels is considered, with results displayed graphically and in tabular form. An application is presented using consumer panel data from Shanghai. Overall, few significant effects are found, suggesting that directly competing brands are bought by fairly similar types of consumer.

2 - Components of Optimal Price Under Logit Demand - An Approximation

Tridib Mazumdar, Chair and Professor - Marketing, Director, Earl V. Snyder Innovation Management Center, and Associate Dean for Faculty Development and Research Whitman School of Management, Syracuse University, Syracuse, NY, 13244-2130, mazumdar@som.syr.edu, S.P. Raj, Amiya Basu

Nash equilibrium optimal price cannot be determined in closed form between profit-maximizing brands under logit demand. However optimal price is well approximated by marginal cost plus weighted sum of three factors in decreasing importance: inverse of price sensitivity, relative value advantage of brand, and average value added by all competitors. The weights depend upon number of competing brands.

3 - Innovate of Imitate, Strategic Innovation in Pharmaceutical Industry

Wonjoon Kim, Korea Advanced Institute of Science and Technology, 383-1, Guseong-dong, Yuseong-gu, Daejeon, Korea, 305-701, wonjoon.kim@yale.edu, Paris Cleanthous

Abstract not Available at this time

TD04

S-Ballroom B

Mass Customization: Methods and Tools

Cluster: Mass Customization in Manufacturing
Invited Session

Chair: Andrew Kusiak, Professor, University of Iowa, 3131 Seamans Center, Iowa City, IA, 52242, United States, andrew-kusiak@uiowa.edu

1 - Product Structures for Mass Customization

Udo Lindemann, Professor, Dr.-Ing., Technische Universitaet Muenchen, Boltzmannstr. 15, Garching, 85748, Germany, maik.maurer@pe.mw.tum.de, Maik Maurer

Analysis, interaction, and optimization of product structures offer far-reaching capabilities for mass customization, as comprehensive product attributes only arise from structural arrangements. We present a methodical support and practical guideline for designing and using such structures in order to push the limits of profitable individualization.

2 - Mass Customization: A Data-Mining Perspective

Andrew Kusiak, Professor, University of Iowa, 3131 Seamans Center, Iowa City, IA, 52242, United States, andrew-kusiak@uiowa.edu

Companies compete in various ways, including offering large product portfolios aimed at meeting expectations of individual customers. Meeting these individual customer demands could significantly increase complexity of products and processes. Various approaches have been considered to manage the product and process complexity. Some of these strategies such as modularity and assemble-to-order will be discussed. The use of data mining to manage product complexity is explored.

3 - Product Family Design: An Approach based on Hybrid Real Options Valuation

Jianxin (Roger) Jiao, Nanyang Technological University, School of Mechanical & Aerospace Engineering, SG, Singapore, jiao@pmail.ntu.edu.sg, Ching Moi Lim, Arun Kumar

Traditional approaches to product family design (PFD) are based on discounted cash flows analysis, which tends to underestimate the upside potentials to a design project from management flexibility. This paper employs a real options approach such that PFD is modeled as an investment strategy. A hybrid real options model is proposed to take into account the value of flexibility either inherent in a project or that can be built in product platforms.

4 - Integrating Order Negotiation to Available-to-Promise (ATP) Planning for Mass Customization

Qinli Zhang, Mr., Hong Kong University of Science and Technology, Advanced Manufacturing Institute, HKUST, Hong Kong, China, qlzhang@ust.hk, Mitchell M. Tseng

Mass Customization strives to meet individual customer needs and achieve mass production efficiency simultaneously. Key to achieve these seemingly contradicting objectives is to resolve conflicts between resource availability and requirements for meeting customer selection. This presentation will report a research based on Available-to-promise to facilitate negotiations between company and customers that streamline the relationship between order specs and resource availability.

TD05

S-Ballroom C

Information Asymmetry in Procurement

Cluster: Supply Chains

Invited Session

Chair: Tunay Tunca, Stanford University, Graduate School of Business, 518 Memorial Way, Stanford, CA, 94305, United States, tunca_tunay@gsb.stanford.edu

1 - Production Flexibility and Capacity Option Pricing with Information Asymmetry

Pamela Pei, Research Assistant, M.I.T., Operations Research Center, M.I.T., Cambridge, MA, United States, ppei@mit.edu

We examine pricing of capacity options with post-contract production and information asymmetry under spot trading. We derive the optimal price scheme for capacity contracts and show that it is governed by two main pricing regimes. We identify the regions under which each regime is preferred by a supplier. We also explore the effects of spot market characteristics on contract design.

2 - Multiple Sourcing and Procurement Process Selection with Bidding Events

Qiong Wu, Stanford University, Graduate School of Business, Stanford University, Stanford, CA, United States, wu_qiong@gsb.stanford.edu, Tunay Tunca

We examine the procurement process selection problem of a large industrial buyer who purchases an intermediate good from a group of suppliers through bidding events. We derive the optimal quantity and contract strategies for a standard single-stage reverse auction process and a two-stage process. We then derive the optimal number of suppliers to be sourced from for both processes and characterize the conditions under which each procurement mode will be optimal.

3 - Supply Chain Coordination under Information Acquisition

Tunay Tunca, Stanford University, Graduate School of Business, 518 Memorial Way, Stanford, CA, 94305, United States, tunca_tunay@gsb.stanford.edu, Hyo Duk Shin

We consider supply chain coordination with investment in demand forecasting. We show that common pricing schemes suffer from lack of coordination in production quantities and forecast. We show that this problem can be solved through flexible pricing. However, with private information, such mechanisms suffer implementation problems. We propose a contracting scheme that utilizes market interaction and resolves the implementation problems in addition to achieving full coordination.

TD06

S-Sung I

Scheduling and Inventory Policies in Supply Chains

Cluster: Production-Inventory Systems

Invited Session

Chair: Susan Xu, Professor, Penn State University, 478 Business Building, Penn State University, University Park, PA, 16801, United States, shx@psu.edu

1 - Spatial Scheduling and Resource Selection with Activity Coordination Requirements

Anant Balakrishnan, University of Texas, 1 University Station B6500, Austin, TX, 78712, United States, anantb@mail.utexas.edu, Brian Roth, Gang Li

Given a set of geographically-dispersed jobs with time windows and inter-job coordination requirements, we address the problem of assigning and routing resources to jobs and sequencing the jobs to minimize the total cost for deploying and re-positioning resources. We formulate this combined routing-scheduling problem as a large-scale integer program, develop valid inequalities to strengthen the model, and report computational results using data from a railway maintenance planning application.

2 - On a Notion of Information Quality and Its Managerial

Jian Yang, Assistant Professor, New Jersey Institute of Technology, Dept. of Ind. & Manu. Engineering, College of Engineering, Newark, NJ, 07102, United States, yang@adm.njit.edu, Frank Chen

We propose a way to compare the quality of information gathered for assessing an underlying random distribution. We show the generality of this notion. For two operations management problems, we verify that better information in the just-defined sense entails better performance.

3 - Managing an Assemble-to-order system with Technology Innovations

Susan Xu, Professor, Penn State University, 478 Business Building, Penn State University, University Park, PA, 16801, United States, shx@psu.edu, Zhaolin Li

We consider an ATO system with frequent, component-based innovations. Two technologies with overlapping life cycles coexist in the market. Cost parameters for each technology evolve dynamically. We study both strategic and operational levels technology-inventory coordination schemes, where the former makes technology and inventory decisions sequentially whereas the latter makes them jointly. We also study a hybrid coordination scheme and show that it often achieves the near optimal performance.

TD07

S-Sung II

Analytical Method and Optimization Application in Service Industry

Cluster: Practice/ORMS in Practice

Invited Session

Chair: Ding Wei, IBM China Research Lab, Zhongguancun Software Park, Haidian dist, Beijing, Be, China, dingw@cn.ibm.com

1 - Resource Allocation Optimization for Enterprise Portfolio Analysis and Alignment

Rongzeng Cao, IBM China Research Lab, Zhongguancun Software Park, Haidian Distr, Beijing, BJ, China, caorongz@cn.ibm.com, Ding Wei, Chunhua Tian, Zhenbo Wang

Most organizations do not have sufficient resources to meet all of their obligations. To address this problem, we propose using enterprise portfolio analysis to select the optimal project mix to maximize the collective benefit. A mathematical model of resource allocation problem and a revised dynamic programming algorithm are proposed based on knapsack problem. Specifically, we discuss practices for the model and algorithm, together with experiences gained in banking industry.

2 - Urban Distribution: A Time-dependent Vehicle Routing Problem

Chunhua Tian, IBM China Research Lab, Building 19 Zhongguancun Software Park, 8 Dongbeiwang West Road, Haidian Distric, Beijing, BJ, China, chtian@cn.ibm.com, Ding Wei, Rongzeng Cao

Urban distribution is a time-dependent vehicle routing problem (TDVRP) since there is great variance in urban traffic within a day. There is no efficient algorithm for general TDVRP. Considering the rhythm in urban traffic, a simplified TDVRP model is proposed. A two-phase heuristic algorithm, consisting of sweeps algorithm for vertexes clustering and 2-Opt algorithm with a new strategy, is presented to reduce computational complexity within polynomial scale.

3 - Worst-case Analysis for Flexible On-line Service Policies

Zhenbo Wang, PhD Student, Tsinghua University, Tsinghua Yuan, Beijing, BJ, China, wzb01@mails.tsinghua.edu.cn, Wenxun Xing

This paper is concerned with a scheduling problem occurred in on-line service systems. In such a system, customers are classified as 'ordinary' and 'special' according to their needs. Ordinary customers can be served on any service facility, while special customers can be served only on the flexible service facilities. This paper studies the worst-case performance of some flexible service policies. We obtain tight worst-case performance bounds for all service policies considered.

4 - Minimal Feasible Sets in Variable Resource Constrained Projects

Wuanan Cui, Student, Huazhong University of Science and Technology, Wu Han, HB, 430074, China, cuiwanan@hotmail.com

Resource availability is usually uneven in different periods of a project scheduling. The makespan or the resource feasibility of a project scheduling will be influenced if the start(or finish) times or the durations of critical activities are changed. This paper proposes the concept of minimal feasible sets(MFS), and then puts forward the methods for establishing resource links by MFS and identifying critical activities and critical sequences. Furthermore, a computational example is given.

TD09

S-Ming I

Scheduling Session

Cluster: Logistics

Invited Session

Chair: Leyuan Shi, Professor, University of Wisconsin-Madison, 266F Mechanical Engi, 1513 University Ave., Madison, WI, 53706, United States, leyuan@engr.wisc.edu

1 - Unrelated Parallel Machine Scheduling with Reinforcement Learning

Michael Weng, Professor, University of South Florida, 4202 E. Fowler Avenue, ENB 118, Tampa, FL, 33620, United States, weng@eng.usf.edu, Li Zheng, Zhicong Zhang

Parallel machine scheduling has many applications in industry. Most research has focused on scheduling static parallel machines. Although reinforcement learning (RL) is widely used in many areas, little research is available in using RL in machine scheduling. This talk discusses a dynamic parallel machine scheduling problem with job classes and setup times, using RL, so as to minimize a weighted flowtime. Numerical experiments indicate the proposed RL algorithm performs well.

2 - Nested Partitions Algorithm for the Extended Job Shop Scheduling Problem

Hoksung Yau, PhD. Candidate, University of Wisconsin-Madison, 1513 University Ave., Madison, WI, 53705, United States, yau@cae.wisc.edu, Yunpeng Pan, Leyuan Shi

We consider a Job Shop scheduling problem in the real industry. We formulate the problem and propose a Nest Partitions approach. Computation results on test instances drawn from a manufacture factory are reported. The results show the effectiveness of the proposed solution procedure.

3 - Earliness-tardiness Scheduling using the Max-min Transportation Lower Bound

Hoksung Yau, PhD. Candidate, University of Wisconsin-Madison, 1513 University Ave., Madison, WI, 53705, United States, yau@cae.wisc.edu, Yunpeng Pan, Leyuan Shi

We propose a branch-and-bound algorithm for the earliness-tardiness scheduling problem that permits idle time. The algorithm makes use of a strong lower bound called the max-min transportation lower bound recently introduced by Pan and Shi. The algorithm also utilizes a domain reduction technique for narrowing down the execution window of each job. The proposed algorithm is validated experimentally and compared with the best results in the literature.

TD10

S-Ming II

Planning and Scheduling in Iron & Steel Industry (2)

Cluster: Discrete and Combinatorial Optimization

Invited Session

Chair: Jiyin Liu, Professor, Loughborough University, Business School, Loughborough, LE, LE11 3TU, United Kingdom, J.Y.Liu@lboro.ac.uk

Co-Chair: Lixin Tang, Institute of Logistics, Northeastern University, Shenyang, China, linxintang@mail.enu.edu.cn

1 - Steel-making Process Scheduling - A Hierarchical Scheduling Algorithm using Lagrangian Relaxation

Reinhard Krappinger, Assistant Professor, University of Innsbruck, Universitätsstrasse 15, Innsbruck, A, 6020, Austria, reinhard.krappinger@uibk.ac.at

The paper develops a hierarchical planning logic for scheduling steelmaking-continuous casting (SM-CC) production. The hierarchical top planning level is considered as a detailed scheduling for CC and as an aggregated production plan on the level of material flows and capacity groups for the SM process. A decomposition approach, based on the lagrangian relaxation is used, which economical interpretation appears the CC as client and the SM as supplier using steering costs for coordination.

2 - A Tabu Search Method for Slab Matching Problem in the Steel Industry

Jiaxiang Luo, The Logistics Institute, Northeastern University, Shenyang, Ln, 110004, China, neuluojia@163.com, Lixin Tang

The matching of the orders against slabs is to reallocate slabs to orders after release the original matching. The problem is formulated as an integer mathematical programming for minimizing the total matching cost. A heuristic method, based on tabu search, combining swap, insertion and multi-exchange-based insertion chain neighborhoods is proposed to produce approximate solutions. Comparison with actual slab matching indicates that the proposed method can produce significantly better matching.

3 - The Column Generation Based Solution for Scheduling on Color-coating Production

Yang Yang, The Logistics Institute, Northeastern University, Shenyang, Ln, 110004, China, maggie810325@163.com, Lixin Tang

A scheduling problem arises on the color-coating production in the steel industry. The problem can be formulated as a Prize-Collecting Vehicle Routing Problem with additional practical constraints. In order to solve the problem by using column generation, the model is then transformed to a set-partitioning formulation where the pricing subproblem is solved by dynamic programming. The computational experiment on the practical data is reported to demonstrate the algorithm efficiency.

4 - The Optimization-based Algorithm for the Open-order Slab Matching Problem in Iron and Steel Industry

Yongyue Zheng, The Logistics Institute, Northeastern University, Shenyang, Ln, 110004, China, zhengyongyue@163.com, Lixin Tang

The open-order slab matching is a frequently encountered problem in steel production. Given a set of orders and a set of open-order slabs, the problem is to determine which slabs may be assigned to suitable orders subject to practical matching constraints. We formulated the problem as an integer programming model and proposed a Lagrangian relaxation for the problem after reduction of search space. Computational experiments on different data collected from the practical production are reported.

TD11

S-Boardroom

Neural Networks and Water Resources

Contributed Session

Chair: Kannachai Kanlayasiri, Faculty of Engineering, King Mongkut's Inst. of Tech. Ladkrabang, Chalokkrung Rd., Ladkrabang, Bangkok, 10520, Thailand, kkkannac@kmitl.ac.th

1 - Development of Groundwater Quality Models

AV Hema Venkat Kumar, Lead Engineer, neST, TC13/58, Gnyalloor Building Complex, Kesavadasapuram, Tiruvandram, 695 004, India, avhema.venkat@gmail.com, Natarajan Venkat Kumar

water quality models based on multiple regression (MR) and artificial neural network (ANN) methods were developed to support dam operations through providing forecasted NH₃-N concentrations. In the models, the NH₃-N concentration for next time step is dependent on dam outflow, river water quality such as alkalinity, temperature, and NH₃-N of previous time step. During the calibration phase, the ANN models compared to MR.

2 - Application of Artificial Neural Networks for Pineapple Maturity Grading

Kannachai Kanlayasiri, Faculty of Engineering, King Mongkut's Inst. of Tech. Ladkrabang, Chalokkrung Rd., Ladkrabang, Bangkok, 10520, Thailand, kkkannac@kmitl.ac.th, Suwane Boonmung, Boonorm Chomtee

The accuracy of the traditional acoustic method for pineapple maturity grading is limited by the nonlinear relationship between the resonant frequency and the fruit ripeness. This study evaluated the performance of the ANN model on pineapple classification using resonant frequency, average firmness and Brix. Results showed that the developed ANN model successfully classified pineapples into three classes—immature, mature, and overmature—with the classification accuracy of more than 83%.

TD12

S-Celestial Court-Jade

E-Business I

Contributed Session

Chair: Yi Wang, Hong Kong Baptist University, Room N1014, 5 Baptist Univ. Rd, SRH, KLT, Hong Kong, Hong Kong, 05446627@hkbu.edu.hk

1 - Citizen Relationship Management and E-government: A Conceptual Model from Empirical Evidence

Manuel Pereira, Vice-President, ACEP-Portuguese Electronic Commerce Association, Taguspark, Porto Salvo, Porto Salvo, Portugal, manueljpereira@yahoo.com, Luis Tavares

The use of electronic channels is still an important way to improve the relationship between the government and the citizens of a country. Portugal, like several other countries, developed several projects that fostered the use of internet in the government. This paper analyses the successful and unsuccessful projects developed by the portuguese government in the e-government field and designs a conceptual model to incorporate the needs of the different stakeholders focused on the citizen needs.

2 - A Process-level Analysis of the Performance Implications of Integrated Retail Operations

Lih-Bin Oh, Doctoral Student, National University of Singapore, 3, Science Drive 2, Singapore, 117543, Singapore, ohlb@comp.nus.edu.sg, Hock-Hai Teo

Retail organizations are integrating their channel resources in order to deliver consistent information and convenient services. The integration of retail store operations with Website's functionalities can lead to enhanced information quality, extended geographical reach and expanded product/service offerings. Based on the survey data collected from net-enabled retail organizations, we developed a structural model to analyze the performance outcomes of various integrated retail processes.

3 - Correlation of Business Performance Metrics with Systems Metrics in E-business Environments

Chris Leowski, Director, CHASS, University of Toronto, 140 St. George St. Suite 707, Bissell Building, Toronto, On, M5S 3G6, Canada, chris@chass.utoronto.ca

Complex e-business applications are prone to performance degradation caused by short-term malfunctioning of system, application or network components, or long-term, from increased load or imbalances in systems architecture. This paper describes a framework for building e-business performance metrics, and correlating them with the underlying IT infrastructure systems metrics, for the purpose of developing tools for benchmarking, monitoring, and capacity management of e-business applications.

4 - A Study of IT Infrastructure and EC Investment on Firm Performance

Yi-Wen Fan, Associate Professor, Department of Information Management, National Central University, No. 300, Jhongda Rd., Jhongli City, Tao-Yuan County, tw, 32001, Taiwan, iwan@mgmt.ncu.edu.tw, Chun-Der Chen, Hong-Kuei Wu

Though scholars & practitioners are keen to understand the contribution of IT infrastructure (ITI) and EC investment (ECI) to firm performance, extra work is still needed for testing the relationship among these constructs. This study examines the impact of ITI and ECI on firm performance based on the resource-based theory. A survey is conducted to collect the empirical data and our findings show the integration of both ITI and ECI has positive impact on firm performance.

5 - Exploring Trust and Its Moderator Effect in Online Auction

Yi Wang, Hong Kong Baptist University, Room N1014, 5 Baptist Univ. Rd, SRH, KLT, Hong Kong, 05446627@hkbu.edu.hk

Due to the impersonal nature of the online environment, the impact of trust on online transaction has been broadly examined. Contrary to prior researches that focused on interpersonal trust, this study separates trust in third parties, specifically intermediaries in the case of online auction, from interpersonal trust. Moreover, the study analyzes the more comprehensive effect of trust in online marketplace with distinctive levels of trust and its moderator effect in online transaction

TD13

S-Celestial Court-Pearl

Return Policy, RFID and Assortment Planning

Contributed Session

Chair: Z. Pelin Bayindir, Middle East Technical Univ., Dept. of IE METU, Ankara, 06531, Turkey, bayindir@ie.metu.edu.tr

1 - Flow Analysis of Spatially-Distributed Closed-Loop Supply Chains for Multiple Customer Classes

Paul Thompson, IBM Global Business Services, 12902 Federal Systems Park Drive, Fairfax, VA, 22033, United States, paul.thompson@us.ibm.com

We consider the problem of managing systems of spatially-distributed, recoverable inventory for multiple customer classes. These problems arise, for example, in leased-equipment operations and in managing fixed plant for cable TV and telephony applications. A nonlinear flow analysis of the economics of the timing of inventory replenishment and of moving inventory from peripheral to central locations leads to several interesting intuitive and non-intuitive results.

2 - Remanufacturing Strategy in Close-Loop Supply Chain

Yasutaka Kainuma, Associate Professor, Tokyo Metropolitan University, 3-6-33, Azumacho, Akishima, Tokyo, 196-8540, Japan, yass.kainuma@nifty.com

The Basic Law for Establishing the Recycling-based Society established in Japan, 3R activities become popular in these days. In addition, remanufacturing with the product reuse and parts reuse are becoming an important strategy in closed-loop supply chain. In this study, we propose the remanufacturing strategy in consideration of the life as well as values of product and/or parts and confirm the efficiency of the proposal.

3 - Identification Technologies and Inventory Costs

Uttarayan Bagchi, Professor, The University of Texas at Austin, McCombs School of Business, 1 University Station, B6500, Austin, TX, 78712-0212, United States, Uttarayan.Bagchi@mcombs.utexas.edu, Alfred Guiffrida, Jack Hayya

We argue that because of the inverse relationship between system variance and information availability, identification technologies such as RFID, will reduce system variance. In addition to reducing average leadtime, RFID will reduce the variance of leadtime, the variance of leadtime demand, the amount of safety stock, and consequently inventory costs.

4 - Assortment Planning and Shelf Space Allocation: A Case Study

Z. Pelin Bayindir, Middle East Technical Univ., Dept. of IE METU, Ankara, 06531, Turkey, bayindir@ie.metu.edu.tr, Tamer Gulsac

In this study, we consider two different approaches for assortment planning and shelf space allocation for a retailer. The first approach is a joint one where both problems are solved in a single iteration. The second approach, widely studied in the literature, considers two problems successively. The results are tested using real data with respect to several performance measures. The proposed methods are also compared with the results of a commercial package widely used in practice.

TD14

S-Celestial Court-Coral

Health Care Performance Evaluations

Cluster: Health Applications - Joint Invited/Sponsored

Chair: Yasar Ozcan, Professor, Virginia Commonwealth University, P.O. Box 980203, 1008 E. Clay St. Rm #213, Richmond, VA, 23298-0203, United States, ozcan@hsc.vcu.edu

1 - A Three-phase Approach for Operating Theatre Schedules

Angela Testi, Professor, Departments of Economic and Quantitative Methods- Diem, University of Genova, Via Vivaldi 2, Genova, 16126, Italy, testi@economia.unige.it, Elena Tanfani, Anna Sciomachen, GianCarlo Torre

Firstly we solve a knapsack - like problem for selecting the number of sessions to be scheduled for each ward. Then we determine optimal time tables by defining the assignment between wards and surgery rooms. Finally we use a simulation model for analysing different sequencings of the surgery activities arising to priority given to LWT, LPT and SPT and outlining possible improvements in terms of utilization rate, throughput and waiting time. Results related to an Italian public hospital are given.

2 - Understanding Super-Efficient DEA Results with an Application to Hospital Inpatient Surgery

Liam O'Neill, University of North Texas, 3500 Camp Bowie Blvd., Fort Worth, TX, 76107, loneill@hsc.unt.edu, Franklin Dexter

We compare two techniques for sensitivity analysis in DEA: multifactor efficiency (MFE) and non-radial super-efficiency (NRSE). MFE and NRSE are basically equivalent for unique optimal solutions. MFE incorporates the slack values from multiple output variables, whereas NRSE does not. We compare results for operating room managers at an Iowa hospital.

3 - Exploring the Relationship Between Organizational Capabilities and Cardiac Surgeon Efficiency

Jon Chilingirian, Associate Professor, Brandeis University, 89 Montrose St., Newton, MA, 02458, United States, chilinge@brandeis.edu

Data Envelopment Analysis was employed to evaluate the efficiency of cardiac surgeons and hospitals over consecutive years and paired to test if the differences are significantly different from zero. A multivariate tobit analysis of surgeon and hospital DEA scores was employed to explore factors that explain differences in efficiency.

4 - Do Electronic Medical Records Improve Efficiency?

Abby Swanson, Virginia Commonwealth University, P.O. Box 980203, 1008 E. Clay St. Rm #213, Richmond, VA, 23298-0203, United States, swanson@vcu.edu, Yasar Ozcan

This study examines the impact of Electronic Medical Records (EMRs) in acute care hospitals. Using a retrospective, non-experimental design, hospitals with EMRs are compared to those without in two areas: efficiency and quality. Efficiency scores are created using Data Envelopment Analysis (DEA). Inputs include capital assets, labor, and number of beds. Outputs include discharges and training hours. Quality is measured with ten Hospital Quality Alliance (HQA) indicators.

■ TD15

S-Celestial Court-Amber

Models and Applications of Cost/ Performance Analysis

Contributed Session

Chair: Chiuh-Cheng Chyu, Associate Professor, Yuan-Ze University, 135 Yuan-Tung Road, Chung-Li, 320, Taiwan, iehshsu@saturn.yzu.edu.tw

1 - Presenting a Model Based on Borda for Personnel Performance Appraisal

Mohammad Anisheh, UE&CRC Corp, No 6-Street 12- Gandhi Street- Tehran-Iran, Tehran, aa, Iran, manisheh@yahoo.com

hence personnel performance appraisal is mean to diagnose their weak and strength points.in this paper the performance appraisal is seen as an element of group decision making and therefore, the personnel are evaluated from different points of view.keeping in mind the attributes weights,and relative importance of auditors evaluations weights,a model has been used based on Borda for personnel ranking.the foregoing method has been used in a case study and the result have been evaluated.

2 - Depreciation Tracking

Elliot Levy, US Dept. of Commerce, #2220 HCHB, Washington, DC, 20230, United States, elliot_levy@ita.doc.gov

From equipment recording, I have estimated straight-line depreciation by obtaining the time length between acquisition and retirement and dividing it into the acquisition cost. The variation in time length for retired computers, as a prototype, was applied in an ANOVA tableau for significant groups of computer usage. Also, these longevity estimates were applied in calculating the probability of exceeding a given standard of length of use.

3 - The Non-declaration of Individual Income Tax Approach in Taiwan

Chun-Ling Chuang, Assistant Professor, Kainan University, No. 1, Kainan Road, Luzhu,, Taoyuan, TW, Taiwan, clchuang@mail.knu.edu.tw, Rong-Ho Lin

In current personal income tax declaration system of Taiwan, there are two declaration operations: citizens have to declare their annual income; National Tax Administration (NTA) collected all related income tax data automatically. In order to reduce the duplicated actions, this study is based on e-government convenient services point of view to build up an individual income tax non-declaration model to eliminate unnecessary waste costs. The suggestions are provided for the reference for NTA.

■ TD16

S-Celestial Court Amethyst

Industry Applications II

Contributed Session

Chair: Meng Dong, Research Scholar, National University of Singapore, BLK E1 #08-20, 1 Engineering Drive 2, Singapore, 117576, Singapore, dongmeng@nus.edu.sg

1 - A Study on Real-Time Postal Logistics Information System

Kibaek Lee, ETRI (Electronics and Telecommunications Research Institute), 161 Gajeong-dong, Yuseong-gu, Daejeon, 305-700, South Korea, lees94@etri.re.kr, Jae Min Lim, Wan Seok Kim, Jong Heung Park

In this paper, we analyze methodology and process of implementing new postal logistics information system including realtime information acquisition function, realtime optimization function and realtime simulation function

2 - An Exact Solution Approach for the Preferential Bidding System Problem in the Airline Industry

Michel Gamache, Professeur Agrégé, Département des génies civil, Géologique et des mines, C.P. 6079 Succ. Centre-Ville, École Polytechnique de Montréal, Montréal, QC, Canada, michel.gamache@polymtl.ca, Heykel Achour, Guy Desaulniers, Francois Soumis

In this presentation, we introduce the first exact approach for constructing aircrew member personalized monthly work schedules when a preferential bidding system (PBS) is used. With such a system, each employee bids for his/her preferred activities, yielding a bidding score for each feasible schedule. The PBS problem thus consists of assigning to each employee a schedule that maximizes, in order of seniority, his/her preferences while covering all crew pairings. The proposed exact solution approach relies on column generation and, when a tentative maximum score for a crew member is established, it explicitly enumerates for that employee all feasible schedules with that score.

3 - Improving Operational Effectiveness at Vehicle Inspection Centre in Malaysia

Azurah A.Samah, Full time Student, University of Salford, 70 B Brideoak Street, Cheetham Hill, Manchester, M80AB, United Kingdom, A.A.samah@pgr.salford.ac.uk

In this research, operational problems at vehicle inspection centres(VIC) in Malaysia are explored and investigated. We offer solutions using operational research (OR) techniques in this new application area, with aims to improve the inspection process and to achieve greater efficiency and throughput at the VIC. In particular, simulation is used to model the interaction of operational activities at the VIC and to experiment with various operational policies.

4 - An Optimization-based Decision Support System for Locating Disaster Relief Centers

Yen-Heng Chen, PhD Student, Institute of Traffic and Transportation, National Chiao Tung University, 4F, 114 Chung Hsiao W. Rd., Sec. 1, Taipei, 10012, Taiwan, ian.tt92g@nctu.edu.tw, Jiuh-Biing Sheu

A two-stage hybrid fuzzy clustering-optimization approach is presented to choose the disaster relief center location of emergency relief system in the crucial rescue period. Fuzzy clustering techniques are first used to classify the damaged areas based on respective relief demand attributes, followed by a multi-objective model employed to determine the optimal location selections. The numerical results indicate that the potential advantage of the proposed model.

5 - Reverse Logistics System Planning for Recycling Electrical Appliances at IBM in Asia Pacific Region

Meng Dong, Research Scholar, National University of Singapore, BLK E1 #08-20, 1 Engineering Drive 2, Singapore, 117576, Singapore, dongmeng@nus.edu.sg, Der-Hong Lee, Wen Bian

This research discusses a case study of reverse logistics system planning for recycling electrical appliances at IBM in Asia Pacific region. The general process of reverse logistics operations in electrical industry is depicted. The mathematical programming method is employed to obtain the solution.

■ TD17

H-Crystal Room 1

Transportation Network Modeling

Sponsor: Transportation Science & Logistics

Sponsored Session

Chair: Qiang Meng, Department of Civil Engineering, National University of Singapore, BLK E1, #07-10, 1 Engineering Drive 2, Singapore, SI, 117576, Singapore, cvemq@nus.edu.sg

1 - Variational Inequalities with an Oracle Operator: Solution Method and Application

Hai Yang, cehyang@ust.hk, Wei Xu, Deren Han, Bingsheng He

We consider variational inequalities (VI) with an oracle operator, for which some functional forms are unknown but solutions for certain sub-VI can be measured. With known functions and partially observable solution information, we develop a progressive trial method to seek the complete solution of the original VI. As one application example, we apply our method to deal with the marginal-cost pricing problem with unknown demand functions.

2 - Modeling the Drivers' day-to-day Route Adjustment and Year-to-year ATIS Adoption in Traffic Networks

Hai-Jun Huang, Professor, Beijing University of Aeronautics and Astronautics, School of Economics and Management, Beijing, 100083, China, hjhuang@mail.nsf.gov.cn

Consider two groups of drivers, one equipped and in compliance with the ATIS advice, another unequipped or equipped but not in compliance with the advice. The perceived path costs and compliance rate of ATIS are updated each day according to the costs experienced last day and their inertia. The adoption of ATIS is updated each year using a social growth and diffusion modeling approach. We investigate the dynamical evolution of both travel behavior and ATIS adoption.

3 - The Optimal Contraflow Lane Configuration Problem

Qiang Meng, Department of Civil Engineering, National University of Singapore, BLK E1, #07-10, 1 Engineering Drive 2, Singapore, SI, 117576, Singapore, cvemq@nus.edu.sg

This paper proposes a bilevel programming model for the optimal contraflow lane configuration problem, in which the upper level problem is a binary integer programming formulation that aims to minimize the total travel delay of a study area, while the lower level problem is a microscopic traffic simulation model that can mimic the dynamic reaction of the drivers resulting from a contraflow lane configuration scheme.

■ TD18

H-Crystal Room 2

Joint Session SOLA/TSL: Cyber Transportation Logistics - A Panel Discussion

Sponsor: Location Analysis
Sponsored Session

Chair: Yupo Chan, Department of Systems Engineering, University of Arkansas at Little Rock, 2801 South University, Little Rock, AR, 72204-1099, yxchan@ualr.edu

1 - A Panel Discussion: Cyber Transportation Logistics

Panelists: Glenn Burrows, Dell Hong Kong Limited; Y.V. Hui, City Univ. of Hong Kong; Hing-Po Lo, City Univ. of Hong Kong; Stephen Nash, National Science Foundation; John Talburt, Acxiom Laboratory for Applied Research, Univ. of Arkansas at Little Rock; Rolf Wigand, Univ. of Arkansas at Little Rock.

Based on the presentations in the Omega Rho feature session and the two sessions on "Cyber Transportation Logistics," representative presenters and special guest – Dr. H.P. Lo, Head, Dept. of Management Sciences, City University of Hong Kong – will discuss the underlying issues and implications for the future.

■ TD19

H-Crystal Room 3

RFID-Based Wireless Manufacturing

Cluster: Web-Service Related Technology
Invited Session

Chair: George Q Huang, Associate Professor, The University of Hong Kong, Pokfulam Road, Hong Kong, HK, China, gqhuang@hkucc.hku.hk

1 - Detection and Control of Impulsive Events in Manufacturing Processes Using RFID

Yanfang Shen, yanfang.shen@clearsightsystems.com, Wolf Kohn

An architecture implementing real-time enterprise planning, scheduling, and control processes based on RFID signals is presented. The central component is a REPAIR process that corrects in real time ERP generated plans, schedules and control actions. In applications, involving flow of perishable goods and others; unpredictable, non-persistent events (impulses) create large transients that negatively disrupt the enterprise.

■ TD20

H-Jade Suite 1

Applications of Neural Networks

Contributed Session

Chair: Bruce Curry, Professor, Cardiff Business School, Colum Drive, Cardiff, CF83 3DF, United Kingdom, curry@cardiff.ac.uk

1 - Effects of Missing Data on Data Mining Algorithms

Chien-Hua Mike Lin, Professor, Cleveland State University, College of Business Administration, 1861 E. 18th St., BU 336, Cleveland, Oh, 44115, United States, lin@cis.csuohio.edu, Heng Dong, Marvin L. Brown

Data mining is based on searching the concatenation of multiple database that usually contain some amount of Missing Data, along with a variable percentage of Inaccurate Data, Pollution, Outliers and Noise. The issue of Missing Data must be addressed, for ignoring this problem can introduce bias into the models being evaluated and lead to inaccurate Data Mining Conclusions. This paper reports the results of using SAS Enterprise Miner to implement several data mining algorithms for testing the impact of missing data and the effects of the employment of data imputation methods.

2 - Urdu Nastaliq Isolated Character Recognition using Neural Networks

Sohail Sattar, Research Scholar, NED University of Engineering & Technology, Department of Computer Science & IT NED, Karachi, Si, Pakistan, sattar@neduet.edu.pk, Syed Salahuddin Hyder, Mahmood Khan Pathan

Latin script character recognition has achieved a tremendous success but Urdu Nastaliq has attracted only a fraction of research in this regard. Urdu uses Arabic script for its writing. We have 39 isolated characters in the alphabet, which are divided into 21 classes according to their features. A Neural Network is created and trained to recognize the bitmaps of isolated Urdu Nastaliq characters. Matlab Neural Network toolbox is used to implement the system, results are most encouraging.

3 - Feedforward Neural Networks: Benefits and Problems

Bruce Curry, Professor, Cardiff Business School, Colum Drive, Cardiff, CF83 3DF, United Kingdom, curry@cardiff.ac.uk

These networks are used because they approximate arbitrary underlying functions. They are a form of nonlinear regression. However, certain problems remain and further research is needed. Two issues of interest to the author are weight redundancy and the technical limitations of the approximation properties of the networks.

■ TD21

H-Jade Suite 2

Marketing Issues in Service

Contributed Session

Chair: Qin Zhang, Assistant Professor of Marketing, Univ. of Texas at Dallas, School of Management, SM 32, Box 830688, Richardson, TX, TX 75083, United States, zhangq@utdallas.edu

1 - Influence of Audio-Visual Effects on Consumption Emotion, Time Perception and Satisfaction

Shih-Chia Wu, Lecturer, Catholic Fu Jen University, 2F 72-1 Jen Ai Rd., Sec 2, Taipei, TW, 24205, Taiwan, chiawu88@gmail.com, Ya-Chung Sun

Tangible and in-tangible cues in retail stores play an important role in affecting consumer attitudes and behavior. Previous studies focused on using actual retail stores as the investigation bases to study the environmental cues. To control previously uncontrolled variables in actual stores, this study adopted a computer graphic design tool to build a virtual realty shopping environment to examine audio-visual effects in all aspects on consumers' shopping behavior through three experiments.

2 - Estimating Nonlinearities in Relationship Marketing for Cross-Cultural Data-Perils and Possibilities

Clara Agustin, Universitat Pompeu Fabra, Department of Economics and Business, Ramon Trias Fargas, 25-27, Barcelona, BA, 08005, Spain, clara.agustin@upf.edu, Jagdip Singh

From Hongkong to Houston and Barcelona to Bombay, globalization is widening the relevance of relationship marketing concepts for understanding marketplace exchanges. Yet cross-cultural studies are limited probably by perils of modeling nonlinearity and cross-cultural validity. This paper systematically organizes the perils of cross-cultural studies of relationship marketing theory and elaborates remedies that are (a) methodologically rigorous, (b) pragmatically feasible, and (c) operationally useful.

3 - Competitive Strategy, Competitive Forces and Business Units Performance in Chain Store Context

Chihwen Wu, Assistant Professor, National Chung Hsing University, 250 Kuo Kuang Rd, Taichung 402, Department of Marketing, Taichung, 402, Taiwan, chihwwu@dragon.nchu.edu.tw

The research incorporated key industry competitive forces, business level strategy and performance construct based on the synthesis of two predominant theories including industrial organization and resource based view. A primary is that new entrants and competitive competency determined the business unit performance and the focus strategy will be an important strategy for sustaining and achieving a competitive strategy.

4 - Profiling the Health-Conscious Segment of Grocery Shoppers Using a Multi-Category Brand Choice Model

Qin Zhang, Assistant Professor of Marketing, Univ. of Texas at Dallas, School of Management, SM 32, Box 830688, Richardson, TX, TX 75083, United States, zhangq@utdallas.edu, Ashutosh Prasad

There is a growing trend of health consciousness among consumers. We provide research on the shopping behavior, characteristics and the size of the health-conscious segment by proposing a multi-category brand choice model in which consumers' responses to healthy products are determined by their and the categories' characteristics. For empirical analysis, we use IRI basket dataset.

Wednesday, 8:00am - 9:30am**■ WA01**

S-Tang II

Quality, Statistics and Reliability I

Cluster: Quality, Statistics and Reliability - Joint Invited/Sponsored

Chair: Jihyun Kim, Research Professor, Research Institute for Information and Communication Technology, 509 Innovation Hall, Korea University, Anam Dong 5Ga, Sungbuk Gu, Seoul, South Korea, jihyunk@korea.ac.kr

1 - Traffic Data Quality Control: Detecting Erroneous and Imputing Missing Values

Peng Wu, PhD. Candidate, Institute of Transportation Studies, UC Davis, One Shields AVE., Davis, CA, 95616, United States, penwu@ucdavis.edu, Shuang Liu

With the growing volume of traffic counts and their expanding applications, users have become increasingly concerned with data quality. This study first detects data errors, and then recommends methods involving time series analysis, factor approach, and statistical regression to impute missing values at different time granularities. The proposed data quality control efforts can enhance the usefulness of traffic data as well as facilitate the inspection of traffic counting equipments.

2 - Embedded Double Signal Discrimination for Photolithography Process

Jihyun Kim, Research Professor, Research Institute for Information and Communication Technology, 509 Innovation Hall, Korea University, Anam Dong 5Ga, Sungbuk Gu, Seoul, South Korea, jihyunk@korea.ac.kr, Sanghyeok Seo, Sung-Shick Kim

Photolithography is one of the key processes in semiconductor manufacturing. Precise control in the process is vital to the overall chip production. By discriminating the disturbances in the process condition and the measurement equipment, precision of the overall control scheme can be achieved. Using statistical and signature analysis techniques, signal discrimination is performed. Evaluation is performed using both simulation and data from test site.

3 - The Development of a Warranty Model for an Automobile Product, by Using Delay-Time Approach

Hairudin Abdul Majid, Full Time Student, University of Salford, CORAS, AEMS, University of Salford, Manchester, M54WT, United Kingdom, H.AbdulMajid@pgr.salford.ac.uk

This research concerns on the development of warranty model for an automobile product. Data set from a Malaysian automobile company is used as the case study. The development of warranty model involves examining the current base warranty which then leads to the establishment of a new extended warranty policy. In order to understand the assumptions and constraints of the developed warranty model, new methodology or model, which involve delay time is then proposed.

4 - Modeling the Reliability of Complex System using Full-System and a Variety of Component Data Sources

Christine Anderson-Cook, Los Alamos National Laboratory, P.O. Box 1663 MS F600, Los Alamos, NM, 87545, United States, candcook@lanl.gov

Statistical models for predicting reliability for complex systems can involve many data sources. For example, a system with many components may undergo full system testing as well as quality assurance testing at the component or sub-system level. The component tests contribute informative about system reliability, although less directly than the system tests. We present a Bayesian model for integrating these types of data into a unified model for improved reliability estimates

■ WA02

S-Tang I

Integrate Decision-making Methods into Efficiency Evaluation

Cluster: Data Envelopment Analysis

Invited Session

Chair: Jie Wu, PhD Student, School of Management, USTC, #96 Jinzhai Road, Hefei, China, wujie012@ustc.edu

Co-Chair: Zhongsheng Hua, Professor and Chairman, Dept. of Information Management & Decision Science, School of Management, University of Science and Technology of China, 96#JinZhai Road, Hefei, AH, 230026, China, zshua@ustc.edu.cn

1 - New DEA Cross Efficiency Based upon Game Theory

Liang Liang, Dean of School of Management, USTC, 96# Jinzhai Road, Hefei, AH, China, lliang@ustc.edu.cn, Joe Zhu

This paper proposes a new cross efficiency method that is based on non-cooperative game. In the game each DMU is considered as a player, its efficiency as strategy and Game-cross efficiency as payoff measure. DEA Nash Equilibrium is presented and the existence of it has been proven. An iterative algorithm is designed to lead to DEA Nash Equilibrium of the game. Some case studies are illustrated and the comparisons between Game-cross efficiency and DEA-cross efficiency are included finally.

2 - Integrated AHP/DEA Model and Its Application

Xinbao Liu, Associate Dean, School of Management, Hefei Polytechnical University, 258# Tunxi Road, Hefei, 230001, China, lxinbao@mail.hf.ah.cn, Shanlin Yang

The integrated AHP/DEA technique is introduced by incorporating AHP and DEA approaches. The technique can integrate favorable aspects of both AHP and DEA to realize comprehensive evaluation with the unification of subjectivity and objectivity. An application example of integrated AHP/DEA shows that this technique can be added to the model and algorithm databases of the Decision Support System (DSS) for the optimization of group farm working planning.

3 - An Approach to Discriminate Non-homogeneous DMUs

Zhongsheng Hua, Professor and Chairman, Dept. of Information Management & Decision Science, School of Management, University of Science and Technology of China, 96#JinZhai Road, Hefei, AH, 230026, China, zshua@ustc.edu.cn

DMUs under DEA evaluation are assumed to be homogeneous. This paper firstly analyzes the impacts of DMUs' non-homogeneity caused by technology difference on the efficiency estimates. An approach based on system cluster analysis is then proposed to discriminate non-homogeneous DMUs, by which DMUs utilizing similar technologies are aggregated in a cluster. Simulated results indicate the effectiveness of our approach.

4 - An Extended Aggregated Ratio Analysis in DEA

Jie Wu, PhD Student, School of Management, USTC, #96 Jinzhai Road, Hefei, China, wujie012@ustc.edu, Liang Liang

We propose an extended aggregated ratio analysis model that is similarly extended from CCR to BCC model in DEA. This extended model also offers an insight into frontier analysis. Whether a DMU is on the frontier or efficient frontier can be informed by proposed extended model. Several results developed in the paper are coincident with that in the literature.

■ WA03

S-Ballroom A

Economics of Information Security

Cluster: Information Security

Invited Session

Chair: Srinivasan Raghunathan, School of Management, University of Texas at Dallas, sraghu@utdallas.edu

1 - Forecasting Firms' Investment Levels in Information Security

Lara Khansa, Department of Operations and Information Management, School of Business, University of Wisconsin, Madison, WI, larak@cae.wisc.edu, Divakaran Liginlal

We propose the revenues of security providers as a proxy of firms' investments in information security. The data relating these revenue indices to the cost of prior malicious attacks and market wellness, measured by the level of the S&P 500 index, are used to train neural networks for forecasting firms' future investment levels. We also offer risk aversion and preference theories to explain the effect of recessions and expansions on firms' security spending and on their stock market performance.

2 - Optimal Configuration of IDS when Facing Potential Strategic Hackers with Heterogeneous Hacking Payoffs

Srinivasan Raghunathan, School of Management, University of Texas at Dallas, sraghu@utdallas.edu, Bin Mai

We study the optimal IDS configuration when facing potential hackers with heterogeneous hacking payoffs and ability of costly faking identity. We show that this faking cost and portion of high payoff hackers in population significantly affect the configuration. The optimal configurations and boundary conditions for each case are derived.

■ WA04

S-Ballroom B

Mass Customization for Automotive Operations - Systems Analysis, Design and Management

Cluster: Mass Customization in Manufacturing

Invited Session

Chair: Bart MacCarthy, Professor of Operations Management, University of Nottingham, Nottingham University Business School, Jubilee Campus, Wollaton Road., Nottingham, NG8 1BB, United Kingdom, Bart.MacCarthy@nottingham.ac.uk

1 - Performance Implications of an Open Pipeline for Automotive Order Fulfilment

Bart MacCarthy, Professor of Operations Management, University of Nottingham, Nottingham University Business School, Jubilee Campus, Wollaton Road., Nottingham, NG8 1BB, United Kingdom, Bart.MacCarthy@nottingham.ac.uk, Philip Brabazon

Build-to-Order (BTO) and Mass Customization (MC) have been predicted as inevitable for the automotive sector but it has been slow to adopt either on a large scale. Enabling customer/dealer access to the extensive planning pipeline that typically exists - the Virtual- Build-to-Order approach - is now emerging as an important fulfilment mechanism. This paper will summarise findings from extensive modelling and simulation studies on fulfilment and inventory performance when the pipeline is opened.

2 - Order Fulfilment at Ford of Europe - Processes and Tools that Improve Customer Satisfaction

Robert Hawkins, IT Strategy Manager, Ford Motor Company, Room 1/170, Eagle Way, Warley, Brentwood, CM13 1AZ, United Kingdom, bhawkins@ford.com

Order Fulfilment (OF) strategies at vehicle manufacturers are rapidly changing in order to satisfy increasingly demanding customers in a very competitive marketplace. This paper takes an enterprise view and shows how new OF processes and tools implemented by Ford of Europe at dealers have improved customer satisfaction by reducing customer order lead-times and specification compromises. The impact of differences in customer and dealer behaviour across countries will also be discussed.

3 - Simulating Ford of Europe's Passenger Vehicle Order Fulfilment System

Philip Brabazon, Research Fellow, Nottingham University, Nottingham Uni Business School, Jubilee Campus, Nottingham, NG8 1BB, United Kingdom, philip.brabazon@nottingham.ac.uk, Robert Hawkins, Bart MacCarthy

To enable the implications of policy and operational decisions to be tested and studied a visual and interactive simulation model has been constructed. The model is object-oriented which has facilitated the development of (replaceable) modules for the key roles in the fulfilment system: customers, dealers, vehicle search, planners, production, delivery, and policy makers.

■ WA05

S-Ballroom C

Joint Session Supply Chains/ Stochastic Models: Supply Chain Management

Cluster: Supply Chains

Invited Session

Chair: Shaohui Zheng, Associate Professor, Hong Kogn University of Science and Technology, Dept. of ISMT, Clear Water Bay, Kowloon, Hong Kong, China, imzheng@ust.hk

1 - Timing Order Fulfilment in a Firm with Two Demand Classes

Qing Li, Assistant Professor, Hong Kong University of Science and Technology, Dept. of ISMT, Clear Water Bay, Kowloon, Hong Kong, China, imqli@ust.hk, Qi-Ming He

We study the order-fulfilment process of a firm producing two customized capital goods. The order arrival time for one of the products is random. The capacity allows the firm to work on only one product at any time. The firm needs to decide the optimal time to start the process as well as the right sequence. We show that under a set of intuitive conditions, the structure of the optimal policy is simple and it can be fully characterized. Several special cases are also discussed.

2 - Confidentiality and Information Sharing in Supply Chain Coordination

Hongtao Zhang, Associate Professor, Hong Kong University of Science and Technology, Dept. of ISMT, Clear Water Bay, Kowloon, Hong Kong, China, imhzhang@ust.hk, Lode Li

In a supply chain of one manufacturer and multiple competing retailers, each retailer has some private information about the uncertain demand function and may choose to disclose it to the manufacturer. While retailers never want to publicly disclose their information, both retailers and the manufacturer will have incentives to engage in confidential information sharing when retail competition is intense. The supply chain is coordinated when all retailers share their information confidentially.

3 - Dynamic Capacity Expansion for a Service Firm with Capacity Deterioration and Supply Uncertainty

Xiuli Chao, Professor, North Carolina State University, Dept. of IE, Raleigh, NC, 27695, United States, xchao@unity.ncsu.edu, Hong Chen, Shaohui Zheng

Motivated by problems facing the telecom industry in China in the past decade, we study a dynamic capacity expansion problem of service firms. There is a random demand for the firm's capacity in each period: the demand in excess of the capacity is lost, and revenue is generated for the fulfilled demand. We characterize the optimal capacity expansion strategies and comparing the profit functions as well as the optimal control policies of different options.

4 - Optimal Policies for Replenishment and Product Substitution

Shaohui Zheng, Associate Professor, Hong Kogn University of Science and Technology, Dept. of ISMT, Clear Water Bay, Kowloon, Hong Kong, China, imzheng@ust.hk, He Xu, David Yao

We study an inventory model that allows substitution among products. Orders of products are made by the retailer at the beginning, which are then used to supply demands for a whole season of N periods. The decisions are the replenishment (order) quantity for each product at the beginning of the season, and the dynamic substitution rule / substitution pricing strategy in each period of the season. Optimal policies with simple structure are developed.

■ WA06

S-Sung I

Use of Information in Inventory Systems

Cluster: Production-Inventory Systems

Invited Session

Chair: Tarkan Tan, Assistant Professor, Eindhoven University of Technology, Dept. of Technology Management, Paviljoen F-07, Eindhoven, 5600MB, Netherlands, t.tan@tm.tue.nl

1 - Optimality of s,S Policies in Inventory System with Advance Demand Information and Flexible Delivery

Tong Wang, INSEAD, 1 Ayer Rajah Avenue, 138676, Singapore, Tong.WANG@insead.edu, Beril Toktay

Our model allows customers to place orders in advance, and early shipment is allowed. We consider two situations: (1) customers demand leadtimes are homogeneous. We show state-dependent (s,S) policies are optimal. (2) Customers are heterogeneous. We propose an approximation, which is a lower bound of the original problem, and an upper-bound heuristic. Numerical analysis quantifies the benefit of ADI and delivery flexibility, and shows introducing flexibility is a win-win solution.

2 - Investment in Improved Inventory Accuracy in a Supply Chain

Fikri Karaesmen, Koc University, Dept. of Ind. Eng., Koc University, Sariyer, Istanbul, 34, 34450, Turkey, fkaraesmen@ku.edu.tr, Canan Uckun, Selcuk Savas

We study a supply chain consisting of a manufacturer and a distributor that ships the items received from the supplier to multiple warehouses. The inventory information is inaccurate in each of the warehouses. However, information accuracy can be attained by investment in RFID technology. We investigate the optimal levels of investment under decentralized decision making and propose coordinating contracts.

3 - Improving Forecasting with Imperfect Advance Demand Information

Tarkan Tan, Assistant Professor, Eindhoven University of Technology, Dept. of Technology Management, Paviljoen F-07, Eindhoven, 5600MB, Netherlands, t.tan@tm.tue.nl

In this talk we consider a make-to-stock system where some customers provide information on their future orders, which are subject to changes in time and hence constituting imperfect advance demand information. We develop a forecasting technique that makes use of this information and we discuss an application at a company that produces dairy ingredients.

■ WA07

S-Sung Il

Forecasting and IT Enabled Supply Chain

Cluster: Practice/ORMS in Practice

Invited Session

Chair: Young Lee, IBM Research, 1101 Kitchawan Road, Yorktown Heights, NY, United States, ymlee@us.ibm.com

1 - An Integrated Model to Forecasting Demand and Improving Salesforce Management in Global Enterprises

Ahmed Abdelrahim, Assistant Professor of Management & Information Systems, Abu Dhabi University, P.O. Box 59911, Abu Dhabi, United Arab Emirates, ahmed.abdelrahim@adu.ac.ae

This paper investigates the impact of market dynamics on the performance of the salesforce in global enterprises and the strategic actions taken by management to forecast and recover from such impact. An empirical model developed and tested. The application of this model examines the interactions of the salesforce with external market players, monitors and controls salesforce performance, develops more accurate and reliable demand forecasts, and support management in assessing their strategy.

2 - Forecasting Workforce Demand using Partially Known Demand Information and Lead Time

Young Lee, IBM Research, 1101 Kitchawan Road, Yorktown Heights, NY, United States, ymlee@us.ibm.com, Daniel Connors

Limited visibility to future workforce demand could result in unsatisfied customer services and high costs of recruiting and managing workforce for service-oriented businesses. We have developed a forecasting method which uses partially known demand prior to the starting date of the work to be done to accurately forecast the future workforce demand for a service business sector of IBM.

3 - IT Enabled Supply Chain: An Indian Case Study

N. Ravichandran, Indian Institute of Management, Ahmedabad 380 015, India, nravi@iimahd.ernet.in

This document traces the development and evolution of information technology in the context of a major automobile manufacturing unit in the Indian context. The inter-linkages between economic environment, intensity of competition, competitive strategy of the organization and the derived information technology strategy, critical decisions in the area of information technology are highlighted to illustrate how a supply chain can be efficiently supported by information technology. The Indian automobile industry (two wheeler) has gone through three distinct phases in the last 50 years. The first phase is characterized by controlled capacity, the second phase was characterized by limited competition and the third phase was subjected to intensive competitive pressures as a consequence of Indian Economic Reforms. Since 1990, every major global two wheeler player is present in India. While the market is expanding, the competitive pressure is intensive. The management of supply chain components (relating to procurement, vendor development, production planning and schedule, distribution of finished product) and their coordination poses distinct challenges under these three different phases. Also the competitive strategy of the organization is completely different. It moved from resource productivity to managing variety and rapid introduction of new products. By using this specific context, we review the decisions made in the information technology department (the choice of hardware and software, portfolio of applications, the mix of executives, implementation methodology, sophistication of applications and the leadership of the department) which enabled the organization to manage the supply chain effectively in the context of the chosen business strategy. We also briefly discuss how the information technology provided a cohesive platform for the organization to effectively coordinate the supply chain activities under different competitive scenario. We believe this case study distinctly demonstrates the linkages between competitive strategy, supply chain efficiency and the enabling role of information technology.

■ WA08

S-Ching

Queueing Models and Applications

Cluster: Queueing Theory & Reliability Analysis

Invited Session

Chair: Hsing Luh, Professor, National Chengchi University, Department of Mathematical Science, Taipei, 116, Taiwan, sl@nccu.edu.tw

1 - Optimal Ordering Policy for An Inventory-Queue System

Kuo-Hwa Chang, Professor, Chung Yuan Chirstian University, 200 Chung-Pei Rd., Chung-Li, 320, Taiwan, kuohwa@cycu.edu.tw

We consider an MTO inventory-queue system and study the dynamic inventory ordering policy by determining the ordering epochs. We model the underlying problem as a Markov decision process to minimize system cost. Under some normal conditions, the optimal policy is proven to be a threshold policy depending on the sizes of demand queue and inventory. Furthermore, the optimal policy can be characterized by a switching curve.

2 - Optimal Control of the N Policy M/G/1 Queue with Server Breakdowns and General Startup Time

Tsung-Yin Wang, Department of Industrial Engineering and Management, National Chiao Tung University, Hsinchu, 30050, Taiwan, ciwang@ntit.edu.tw, Wen Lea Pearn, Kuo-Hsiung Wang

We study the N policy M/G/1 queue with server breakdowns and startup times. Service times, repair times, and startup times are generally distributed. When the queue length reaches N, the server is turned on but is temporarily unavailable to serve the waiting customers. The server needs a startup time before providing service until the system is empty. The total expected cost function is developed to determine the optimal threshold N at minimum cost. Sensitivity analysis is also studied.

3 - A Maximum Entropy Approach for the (p, N)-Policy M/G/1 Queue with Server Breakdowns

Kuo-Hsiung Wang, Professor, National Chung-Hsing University, Department of Applied Mathematics, Taichung, 402, Taiwan, khwang@nchu.edu.tw, Kai-Bin Huang

We analyze the (p, N)-policy M/G/1 queue with server breakdowns. Service and repair times obey general distribution. When the queue length becomes N, turn the server on with probability p and leave the server off with probability (1-p). We derive the maximum entropy approximate solutions by using Lagrange's method. We perform comparative analysis between derived approximate results with exact results. We demonstrate that maximum entropy approach is sufficiently accurate for practical use.

4 - A Comparison Method in Fuzzy Queue Modeling

Hsing Luh, Professor, National Chengchi University, Department of Mathematical Science, Taipei, 116, Taiwan, sl@nccu.edu.tw, Yi-Chih Chen, Wang Chia-Hung

In this paper, we consider a fuzzy queueing model that minimizes a total cost incurred in the system. The system which consists of the fuzzy interarrival time and fuzzy service time gives a fuzzy Markov chain structure. It results in an irregular shape of the membership function of the total cost. The objective of this paper is to discuss how to compare fuzzy numbers and decide the optimal number of servers while minimizing the total cost.

■ WA09

S-Ming I

Supply Chain Planning & Scheduling

Cluster: Logistics

Invited Session

Chair: I A Karimi, Professor, National University of Singapore, Dept. of Chemical & Biomolecular Eng, 4, Engineering Drive 4, Singapore, SG, 117576, Singapore, cheiak@nus.edu.sg

1 - Combined Pricing and Portfolio Option Contract Procurement

Qi Fu, Hong Kong University of Science and Tech, Kowloon, Hong Kong, fuqi@ust.hk, Xiuli Chao, Sean Xiang Zhou, Chung-Yee Lee

This paper analyzes the joint pricing and portfolio procurement strategy in a multi-period setting. The firm employs a portfolio procurement approach, comprising a set of option contracts at different levels of flexibility and cost offer. The product demand is price sensitive and i.i.d. in each period. We characterize the optimal pricing, option reservation, and inventory replenishment policies and investigate the interactions among the decisions.

2 - Dynamic Balancing of Inventories in Retail Supply Chains

Narayan Rangaraj, Professor, Indian Institute of Technology - Bombay, IEOR, IIT - Bombay, Powai, Mumbai, 400076, India, narayan.rangaraj@iitb.ac.in, Chetan Desai

A distribution problem is solved, which has a supplier facing multiple retailers with different cost structures and demands. The solution is through dynamic programming supplemented by appropriate heuristics and improved order-up-to levels are derived compared to traditional approaches. The work is partly motivated by RFID possibilities in retail supply chains.

3 - Contract Selection for Raw Material Procurement

Mukta Bansal, Research Scholar, National University of Singapore, Department for Chem & Biomolecular Engg, 4 Engineering Drive 4, Singapore, SG, 117576, Singapore, mukta@nus.edu.sg, I A Karimi, Rajagopalan Srinivasan

Most Chemical Companies prefer long-term contracts with their raw material suppliers. Such contracts allow risk sharing in the face of many uncertainties. However, contracts come in various shades of pricing, quality, lead time, terms, durations etc. Hence, selecting suppliers and contracts is a non-trivial problem that has received less attention. We consider the optimal selection of raw material contracts with a minimum total order quantity commitment using a mathematical programming approach.

■ WA10

S-Ming Il

Optimization of Varies Problems

Contributed Session

Chair: Zhongfu Zhang, Institute of Applied Mathematics, Lanzhou Jiaotong University, Lanzhou, 730070, China, z.zhongfu@163.com

1 - Triscanning Algorithm Approach for TSP Problems

Rong-Ho Lin, Associate Professor, National Taipei Univ. of Technology, No. 1, Section 3, Chung-Hsiao Road, Taipei, TW, Taiwan, rhlin@ntut.edu.tw, Chun-Ling Chuang, Yau-Loong Hong

TSP is a classic combinatorial optimization problem which applied in many related fields. It's time consuming to solve by using the typical mathematic methods. In this study a Triscanning algorithm (TA) is proposed which includes convex hull, geometry structure, maximum the ratio of the perimeter and area of triangle to solve the TSP. The TA was compared with Christofides, Greedy and Nearest neighbor algorithms in three examples from TSPLIB to validate its best solution and effectiveness.

2 - A New Mathematical Model for Course Timetabling Problem

Aldy Gunawan, Ph D student, National University of Singapore, 10 Kent Ridge Crescent, Singapore, 119260, Singapore, g0500710@nus.edu.sg, Ng Kien Ming, Poh Kim Leng

A new mathematical model for timetabling problem is proposed. The model combines teacher assignment and course scheduling problems simultaneously which causes the entire problem to be more complex. The models for several random data sets are solved. However, the CPU time needed to find the optimal solution increases rapidly when the problem size increases. We offer suggestions to handle the situation when the optimal solution to the problem could not be found within reasonable computation time.

3 - A Note on the Relation of Adjacent Strong Edge Coloring and Total Coloring of Graphs

Zhongfu Zhang, Institute of Applied Mathematics, Lanzhou Jiaotong University, Lanzhou, 730070, China, z.zhongfu@163.com, Xiang'en Chen, Jingwen Li, Hao Li

In this paper, we have proved for k -regular simple graph G , $\chi_{st}(G) = k + 1$ if and only if $\chi_{t}(G) = k + 1$. Key words: Graph, Total coloring, Adjacent strong edge coloring. MR(2000) Subject Classifications :05C15,68R10,94C15.

■ WA12

S-Celestial Court-Jade

E-Business II

Contributed Session

Chair: Cheng-Min Feng, Professor, National Chiao Tung University, 4F, 114 Sec. 1, Chung-Hsiao W. Rd., Taip, Taipei, Taiwan, cmfeng@mail.nctu.edu.tw

1 - The Influence of Using Instant Messaging on Behavior of Human Interaction

Yueh-Chiang Lee, Lecturer, Department of Business Administration, Vanung University, No.1. Vanung Rd., Chung-Li, 32061, Taiwan, ycllee@msa.vnu.edu.tw, Ya-Chung Sun, Morris Wang

The convenience of using Instant Messaging (IM) has changed the way in communication. The open literature finds out that IM has become the first choice, even outnumbered the face-to-face mode. The research investigates the influences between human interaction and Instant Messaging by statistical analysis. The results show that most of the influences have the positive impact while the item 'gender' is significant.

2 - Perception on Web Site Development: A Comparative Study Between Marketers and Internet Users

Chai Lee Goi, Lecturer, Curtin University of Technology, CDT250, 98009 Miri, Sarawak, Miri, 98009, Malaysia, goi.chai.lee@curtin.edu.my

The objective of this research is to study the perception of marketers and Internet users on Web site development. The study of Web site development will be based on four factors, which are planning and preparation; development and design; management and maintenance; and security, privacy and trust. SPSS is used to analyse collected data based on T-Test and coefficient correlation.

3 - Effective Inventory Management by using CPFR? An Example of Li-San Group in Taiwan

Kuan-Chieh Fang, Aletheia University, 70-11 Pei-Shi-Liao Matou, Tainan, Tainan, TW, Taiwan, ua935935@yahoo.com.tw, Chich-Jen Shieh, Chun-Hao Lin

Manufacturers and distributors suffered from the inventory problems and it influences the overseas goods in short supply that the demand is unstable, and affording discount losses on a price reduction. This study except the method of

interview on the spot and interview, it also carried out case studies on Li-San Group channeling into e of CPFR system. Lastly, Li-San Group presents the essence performance after channeling into CPFR.

4 - The Effect of Changing Pricing Scheme on the Usage of Broadband Internet Service

Jungsuk Oh, Assistant Professor, KAIST, 207-43, Chengryangri-dong, Dongdaemun-gu, Seoul, 130-722, South Korea, jsok@kgsu.kaist.ac.kr

When switching from flat pricing to usage-based pricing, usage reduction normally follows. Utilizing risk-aversion factor, we partition this reduction into "positive reduction" and "negative reduction" according to their desirability in terms of efficiency of resource allocation and consumer surplus. This paper points out that the negative usage reduction can decrease as the value of online contents increases and is kept high under usage-based pricing scheme.

5 - The Evaluation of Retailing Delivery Service Quality by AHP

Cheng-Min Feng, Professor, National Chiao Tung University, 4F, 114 Sec. 1, Chung-Hsiao W. Rd., Taip, Taipei, Taiwan, cmfeng@mail.nctu.edu.tw, Yu-Kai Huang

Convenience stores in Taiwan have integrated the e-commerce with the logistics system to a new retail delivery model: On-line shopping and pick-up goods in convenience store. We construct a hierarchy of objectives and criteria about retailing delivery service quality by AHP. According to our results, the most concerned attribute is correct of e-map, correct of logistics information and the procedure of any change of deliver. The results are useful for a logistic management in the e-retailing.

■ WA13

S-Celestial Court-Pearl

Supply Chain Network and Decisions

Contributed Session

Chair: Xiaolong Zhang, Assistant Professor, Georgia Southern University, Dept. of Finance and Quant. Analysis, Box 8109, Statesboro, GA, 30460, United States, xzhang@georgiasouthern.edu

1 - The Complexity of Networked Supply Chain

Weiqi Li, Assistant Professor, University of Michigan-Flint, 303 East Kearsley Street, Flint, MI, 48502, United States, weli@umflint.edu, Ming Jiang

Networked supply chain creates many more degrees of freedom in the way how recourses can be arranged and managed, creating possibilities for cost reduction, new capabilities, and new business models, but also poses challenges in understanding the implications of possible supply chain designs and management actions. One of challenges is the complexity. This study takes a close look at the interaction between computational complexity and economic considerations in the networked supply chain.

2 - Supply Chain Supernetworks: Multicriteria Decision - Making Under Uncertainty

June Dong, State University of New York, School of Business, Oswego, NY, 13126, United States, dong@oswego.edu

We present a supply chain network model with multiple tiers of decision-makers, consisting of manufacturers, distributors, and retailers, who can compete within a tier but cooperate between tiers. We consider multicriteria as well as uncertainty for different decision-makers. We derive the optimality conditions, establish the equilibrium conditions, and obtain the variational inequality formulation. Qualitative properties are studied along with a computational procedure and convergence results.

3 - When and How to Advance Sell

Steven Shugan, Professor, University of Florida, 2030 NW 24th Avenue, Gainesville, FL, 32605, United States, sms@ufl.edu, Jinhong Xie

We show that advance-selling profits do not come from buyer surplus, but from more buyers being able to purchase. We determine when and how to advance sell in a variety of situations, including situations with limited capacity, second-period arrivals, refunds, buyer risk aversion, exogenous credibility, continuous preference distributions, and premium pricing. We determine when advance selling improves profits and, when it does, how to set advance prices.

4 - Optimal Bundle Formation and Pricing of Two Products with Limited Stock

Alper Sen, Assistant Professor, Bilkent University, Department of Industrial Engineering, Bilkent, Ankara, 06800, Turkey, alpersen@bilkent.edu.tr, Salih Oztop, Ulku Gurler

We consider a retailer that sells a fixed stock of two products not only as independent items but also as a bundle over a season. The retailer decides how many bundles to form and what prices to charge for the bundle so that expected profits over season are maximized. Product demands follow a Poisson Process and customer reservation prices are assumed to have a joint distribution. We study the impact of reservation prices, inventory levels, arrival rates and bundle formation costs.

5 - A Joint Marketing-Production Control Problem

Xiaolong Zhang, Assistant Professor, Georgia Southern University, Dept. of Finance and Quant. Analysis, Box 8109, Statesboro, GA, 30460, United States, xzhang@georgiasouthern.edu, Jian Yang

This paper develops a joint marketing-production model in which the optimal control of both activities are investigated. The customer demand is assumed to depend on a stochastic state variable that captures the temporal dynamics of the market. We consider several patterns of marketing responses of the state variable to marketing efforts. For each pattern, joint marketing-production control policies are developed.

■ WA14

S-Celestial Court-Coral

Healthcare Quality - I

Cluster: Health Applications - Joint Invited/Sponsored

Chair: H David Sherman, Professor, Northeastern University, 404 Hayden Hall, 365 Huntington Ave., Boston, MA, 02115, United States, h.sherman@neu.edu

1 - Partnering with Clinical Managers to Challenge Reality Models: The Case of Transplant Decisions and Capacity Constraints

Jon Chilingirian, Associate Professor, Brandeis University, 89 Montrose St., Newton, MA, 02458, United States, chilinge@brandeis.edu

The paper will tell the story of a capacity problem at a medical center in Belgium that almost required canceling a combined liver-kidney transplant surgery with an available donor organ. I develop a multifaceted framework to understand this event: viewed from a technical, cultural, and a political point of view.

2 - Patient-level Integrated Statistical Process Control and Bounded Feedback Adjustment Schemes

James C. Benneyan, Northeastern University, 360 Huntington Avenue, Boston, MA, 02115, United States, benneyan@coe.neu.edu, Ipek Ozer Stillman

We investigate the integration of SPC with bounded feedback adjustment to manage patient physiologic processes for which periodic rather than continuous adjustments are preferable due to the costs, practicality, and clinical impact of frequent modifications. Introduction of a control deadband is shown to have several implications on the best way to apply SPC in these contexts.

3 - Hospital Quality Measurement - Framework for Research and Quality Improvement

H David Sherman, Professor, Northeastern University, 404 Hayden Hall, 365 Huntington Ave., Boston, MA, 02115, United States, h.sherman@neu.edu, Joe Zhu

Lower cost & higher quality health care are universal widely researched objectives. However, quality is often mis-specified. Public quality reporting seeks to improve quality by enabling patients to select high quality providers. Incomplete or poor data compromises these initiatives. A comprehensive framework of hospital care quality dimension (KPMG-funding) will be presented as a foundation for health care quality/cost research. Interviews & survey evaluate efficacy of quality reporting.

■ WA15

S-Celestial Court-Amber

Multicriteria Decision Making

Contributed Session

Chair: Juite Wang, Professor, National Chung Hsing University, 250 KuoKuang Road, Taichung, 402, Taiwan, rdwang@nchu.edu.tw

1 - An Approach to Determine the Uncertain Weights in Multiple Criteria Decision-Making

Zhu Haiping, Huazhong University of Science and Technology, Wuhan, Hubei, Wuhan, 430074, China, haipzhu@263.net

It is not uncommon in multiple criteria decision-making that the weights of criteria cannot be completely determined due to the partial information. In this paper, four types of constraints on weights are differentiated and formerly described. A quadratic programming model to calculate the weights is designed by synthesizing all these constraints and taking the minimum square sum of distance to the ideal solution as the objective function. Finally a case study about the project bidding is given.

2 - Fuzzy Multi-Criteria Multi-Mode Resource Constrained Project Scheduling Problem

Mohammad Delasay Sorkhab, University of Tehran, No.4. 2nd Parastoo St., Laj St., Taherkhani Ave., Farahzadi Blvd., Shahrak-e-Ghods, Tehran, Iran, delasa@engmail.ut.ac.ir, Masoud Rabbani, Reza Tavakkoli Moghadam, Fariborz Jolai

This paper has considered the multi-criteria multi-mode RCPSP. The considered criteria are project make span, cost and resource leveling index. Due to the uncertainty nature of projects, activity durations are considered to be fuzzy. To deal with the NP-hard nature of the RCPSP, genetic algorithm is applied as the solving procedure. Chromosome structures and GA operators are modified for the fuzzy environment.

3 - A Hybrid Decision-Aid Model for Partner Selection in Collaborative Product Development

Juite Wang, Professor, National Chung Hsing University, 250 KuoKuang Road, Taichung, 402, Taiwan, rdwang@nchu.edu.tw

Partner selection that is a key determinant of co-development success involves multiple selection criteria and constraints that are either qualitative or quantitative. This paper proposes a fuzzy hybrid decision-aid model that integrates a multi-criteria outranking approach with a fuzzy integer programming model and a genetic algorithm to select partners that maximize the total performance score and satisfy the constraints of target development time and cost.

■ WA16

S-Celestial Court Amethyst

Selected Topics on Research and Development

Contributed Session

Co-Chair: S.P. Raj, Professor, Cornell University, 146 Warren Hall, Ithaca, NY, 14853, United States, spr24@cornell.edu

1 - Models and Software for Improving the Profitability of Pharmaceutical Research

Jiun-Yu Yu, Dept. of Statistics, University of Oxford, 1 South Parks Road, Oxford, United Kingdom, yu@stats.ox.ac.uk, John Gittins

This paper contributes to the task of improving the effectiveness of pre-clinical research for new drug discovery. Our model investigates the number of lead series to be optimised in the search for development compounds which are sufficiently promising to proceed to clinical trials, and the numbers of scientists to be allocated to each research stages. Two profitability criteria are considered. Software designed to implement the optimisation calculations is shown to produce reasonable results.

2 - Decision Consistency of Competitive Strategy and New Product Development

Ziqi Liao, Department of Finance and Decision Science, Hong Kong Baptist University, Hong Kong, victor@hkbu.edu.hk

This paper presents a heuristic model which enables the consistent decision-making of competitive strategy and new product development. Competitive strategy is formulated in the light of a particular market and industry environment. At the same time, new product development projects are determined in line with the competitive strategy, consumer demand, technical expertise and resource constraint.

3 - Using Structural Attributes to Benefit from Product and Process Complexity

Maik Maurer, Dipl.-Ing., Institute of Product Development, TUM, Boltzmannstr. 15, Garching, Germany, maurer@pe.mw.tum.de, Frank Deubzer, Udo Lindemann

Due to market demands, product and process complexity became inevitable facts. Established methods aim at reducing complexity without considering its positive potential. Companies handling complex interdependency networks can create inimitable competence, because only individually deduced products are externally visible. We present practical methods for complexity handling using structural attributes.

4 - Succeeding in the Open Innovation Paradigm: Implications for Corporate R&D

S.P. Raj, Professor, Cornell University, 146 Warren Hall, Ithaca, NY, 14853, United States, spr24@cornell.edu, Dave Wilemon, Jason Pattit

New products require integrating disparate technical knowledge. Thus firms lacking the skills to develop complex products look to external sources. Drivers have contributed to a shift in the innovation landscape, with implications for the sourcing of R&D. We examine how a variety of factors influence the decision to outsource R&D, and discuss issues relevant to managers struggling with the emerging Open Innovation paradigm.

■ WA17

H-Crystal Room 1

Transportation Planning and Operations I

Sponsor: Transportation Science & Logistics
Sponsored Session

Chair: Hong Lo., Department of Civil Engineering, Hong Kong University of Science and Technology, Clear Water Bay, Hong Kong, China, cehklo@ust.hk

1 - Genetic Fuzzy Logic Transit Preemption Signal Controller with Consideration of Loading Information

Yu-Chiou Chiou, Department of Traffic and Transportation Engineering and Management, Feng Chia University, Taiwan, ychiou@fcu.edu.tw, Ming-Te Wang, Lawrence W. Lan

This paper develops a transit preemption signal (TPS) model by genetic fuzzy logic controller (GFLC), which considers three state variables including traffic flows, queuing length, and passenger load information. The control variable is the necessity for giving priority to the actuated transit vehicles. The control performances of the TPS strategies with or without load information are compared.

2 - Integrating Urban Public Transit Subsystems: A Hub-and-Spoke Network Perspective

Qiang Meng, Department of Civil Engineering, National University of Singapore, BLK E1, #07-10, 1 Engineering Drive 2, Singapore, SI, 117576, Singapore, cvemq@nus.edu.sg

This paper proposes a hub-and-spoke network framework for integrating public bus and massive rapid transit (MRT) subsystems. The framework is formulated as an integer programming model which can be solved by a meta-heuristic method developed in this study. Finally, an illustrative numerical example is carried out to demonstrate the proposed methodology.

3 - Planning for Sustainable Public Transit Services

Hong Lo, Department of Civil Engineering, Hong Kong University of Science and Technology, Clear Water Bay, Hong Kong, China, cehklo@ust.hk, Z. W. Wang

Public transit services (PTS) are important assets to any major city. Their benefits are many - increased mobility for all, reduced car dependence, etc. It is ideal if the services are financially sustainable. The key lies in how the urban form is planned in relation to PTS. In particular, the urban density plays an important role. This study will develop an analytical model to examine the relationship between urban density and the provision of sustainable rail transit services.

■ WA18

H-Crystal Room 2

Location Modeling

Sponsor: Location Analysis
Sponsored Session

Chair: Atsuo Suzuki, Nanzan University, 27 Seirei-cho, Seto, Ai, Japan, atsuo@nanzan-u.ac.jp

1 - Response Areas for Ambulances Using Network Voronoi Diagram

Keisuke Inakawa, Assist. Professor, Nanzan University, 27 Seirei-cho, Seto, AI, 4890863, Japan, inakawa@nanzan-u.ac.jp, Takehiro Furuta, Atsuo Suzuki

We propose a method to make response areas by using the higher-order network Voronoi diagram. The higher-order network Voronoi diagram enables us to divide easily a transportation network into response areas with the permutation of stations. The method is applied to the ambulance system of Seto city in Japan. And our response areas are compared with the actual response areas of the city by the mean response time.

2 - Finding Approximate p-centers of Networks in Parallel

Hajime Miyazawa, Nanzan University, 27 Seirei-cho, Seto, 489-0863, Japan, miyazawa@nanzan-u.ac.jp, Takehiro Furuta, Atsuo Suzuki

This paper describes a parallel computation of our algorithm that finds approximate p-centers of networks. In the algorithm, the target network is divided into p-subnetworks using network Voronoi diagram. The 1-center on each subnetwork approximates one of the p-centers of the whole network. These 1-centers can be efficiently computed in parallel. Experiments show that parallel computation of the algorithm is useful especially for large-scale networks such as actual road networks.

3 - Optimization Model of Ambulance Location Problem and Simulation Analysis

Hozumi Morohosi, National Graduate Institute for Policy Studies, 7-22-1 Roppongi, Minato-ku, Tokyo, TK, 106-8677, Japan, morohosi@grips.ac.jp, Hidetaka Kawai, Tatsuo Oyama

We apply an optimization model to ambulance location problem in order to find the optimal location that minimizes total traveling distance of ambulance cars. Using Tokyo metropolitan ambulance call data, we compare the actual location and optimal location. Queuing model is also used to analyze the solution of optimization model. We estimate several statistical features of optimal solution by using queuing simulation.

4 - A Heuristic Approach to Sensor Networking problems

Atsuo Suzuki, Nanzan University, 27 Seirei-cho, Seto, Ai, Japan, atsuo@nanzan-u.ac.jp, Fumio Ishizaki, Hajime Miyazawa, Takehiro Furuta, Mihiro Sasaki

We propose a new heuristic algorithm for sensor networking problems. When many small wireless sensors are scattered in a region, the problem is to construct a virtual network of these sensors so as to monitor the region as long as possible. The critical resource of the sensor network is the duration of the batteries of the sensors. We formulate the problem as a mixed integer programming problem and solve it by a heuristic method using the network Voronoi diagram.

■ WA19

H-Crystal Room 3

Web Services for Data Mining Applications

Cluster: Web-Service Related Technology
Invited Session

Chair: Ming-Yen Lin, Dr., Feng Chia University, No. 100 Wenhwa Rd., Seatwen, Taichung, TW, 40724, Taiwan, linmy@fcu.edu.tw

1 - Ontology Learning from Query Logs of Web Search Engines

Man-Kwan Shan, Dr., National Cheng Chi University, Dept. of Computer Science, 64, Chih-Nan Rd., Wen-Shan, Taipei, 116, Taiwan, mkshan@cs.nccu.edu.tw, Mao-Fu Chen

Ontology can be used to organize, manage and share knowledge. It is useful for web service. To construct ontology is usually a time-consuming task. In this paper, we investigate the ontology learning method based on the query logs of search engines. We analyze the query behavior of users on search engine and the relations between query terms. The constructed ontology is made up of query terms and associated relations. We have implemented the system for ontology learning to verify our approach.

2 - A Study of Vehicle Routing Problem with Time Windows Using Clustering and Tabu Search Algorithm

Tsai-Yun Liao, Dr., Chaoyang University of Technology, No.168, Jifong E. Rd., Wufong Township, Taichung County, TW, 41349, Taiwan, tylio@cyut.edu.tw, Shu-Jung Chou

This research focuses on using artificial neural network (ANN), time-divided procedure, and Tabu search (TS) algorithm for Vehicle Routing Problem with Time Windows (VRPTW). ANN is used to cluster seed customers during the initialization phase of an insertion heuristic for VRPTW. Time-divided procedure is applied when the location of customers is scattered over the geographic area. TS is copied to improve the vehicle routing after the initialization phase of an insertion heuristic.

3 - Mining Multidimensional Service Patterns with Time Constraints in a Mobile Commerce Environment

Sue-Chen Hsueh, Dr., Department of Information Management, Chaoyang University of Technology, 168 Jifong E. Rd., Wufong Township, Taichung county, 41349, Taiwan, schsueh@cyut.edu.tw, Ming-Yen Lin, Kun-Lin Lu

Current mobile systems generally broadcast services to users by locations without considering their usage patterns. Although some research tends to improve the services with spatial relationships, the precision is still not high. In this paper, we propose a multidimensional mining mechanism to enhance location-aware services. By using an efficient sequential-pattern mining algorithm with enhanced time-constraints, the mechanism may bring accurate and personalized services to the mobile users.

4 - A Text Mining Scheme for the Construction of Web Navigation Structures

Hsin-Chang Yang, Dr., Chang Jung University, Dept. Comp. Sci. and Info. Eng., Chang Jung University, Tainan, TW, Taiwan, hcyang@mail.cju.edu.tw, Chung-Hong Lee

In this work, we propose a text mining scheme based on self-organizing maps for web navigational structure construction. A text mining process is applied on a corpus of web pages to identify the topics and discover the relations among them and construct a thematic navigation structure. A self-organizing map is constructed to train the web pages and obtain two feature maps. We then use these maps to develop a structure that may assist the users finding the information they need.

■ WA20

H-Jade Suite 1

Heuristic Programming

Contributed Session

Chair: John Baugh, Professor, North Carolina State University, Department of Civil Engineering, Raleigh, NC, 27695, United States, john.baugh@ncsu.edu

1 - A Heuristic Algorithm For Assignment Reduction Under Imperfect Information System

Gong Jun, Northeast University, Northeast University 135#, Shenyang, 110004, China, gongjun@ise.neu.edu.cn, Tang Jiafu

Knowledge reduction is the kernel of the rough set theory, also is the focal point of algorithm research for rough set. In this paper, we investigate knowledge reduction of imperfect information system. Based on tolerance relation, an assignment reduction based on GA is put forward. Finally, the experimental results show the algorithm is effective.

2 - An Analogous Ant Colony System Algorithm for Concave Cost Transshipment Problems

Yu-Lin Shih, National Central University Dept. of Civil Engineering, No. 300 Jhongda Rd., Jhongli city, TW, 32001, Taiwan, 93342010@cc.ncu.edu.tw, Shangyao Yan, Cheng-Lan Wang

This research develops an ant colony system based algorithm to efficiently solve concave cost transshipment problems that are characterized as NP-hard. Two heuristics for generating the initial solutions are also developed to evaluate the algorithm. The preliminary test results show that the algorithm is potentially useful.

3 - Shortest Weighted Congestion Polynomial Time Path Algorithm Based on Dijkstra's Algorithm for Quality

Gaurav Bajpai, Research Scholar, Uttar Pradesh Technical University, h-27 Sector I Jankiouram Lucknow, Lucknow, 226021, India, gb.bajpai@gmail.com

In this paper we present an algorithm shortest weighted congestion polynomial time path algorithm based on Dijkstras algorithm for improved quality of service where congestion parameters are taken as weighted equivalents resulting algorithm provides quickest method to transfer packets from one source to another destination. In congested medium we take congestion parameters additive to adjacency matrix using optimization techniques.

4 - Achieving Asynchrony in Global Parallel Genetic Algorithms using Dataflow Scheduling

John Baugh, Professor, North Carolina State University, Department of Civil Engineering, Raleigh, NC, 27695, United States, john.baugh@ncsu.edu

Genetic algorithms are an attractive class of techniques whose implementation on distributed platforms can provide the necessary power to solve large-scale problems. On heterogeneous networks, however, performance can be limited by synchronization points during the computation, particularly those between generations. We present an approach for implementing asynchronous GAs using dataflow scheduling, which improves performance while retaining the functional properties of a global parallel GA.

■ WA21

H-Jade Suite 2

Economic Modeling in Marketing

Contributed Session

Chair: Nevena Koukova, Assistant Professor of Marketing, Lehigh University, 621 Taylor Street, Bethlehem, PA, 18015, United States, nkoukova@lehigh.edu

1 - Traffic Generation and Price Promotional Strategies

Cenk Kocas, Sabanci University, Orhanli Tuzla, Istanbul, Turkey, kocas@sabanciuniv.edu

In this study we analyze the pricing strategies of competing retailers that generate traffic through price promotions and profit from cross selling of items in a general shopping basket. The general case under investigation is similar to the case of loss leaders. We work with a stylized duopolistic model of retailers each of which sells two identical homogenous products. We aim to provide a traffic generation explanation to the retailing strategy of offering price promotions.

2 - Estimating Multimarket Contact Effect in a Business to Business Market

Donglei Qiu, Purdue University, 403 W. State Street, Krannert 544, West Lafayette, IN, 47907, United States, dqiu@purdue.edu, Teck H. Ho, Xin Wang

This paper studies the multimarket contact effect in a B2B automobile parts market. In this market, the buyer submits an RFP, and the supplier with the most

complete quote and the lowest price wins the order. We empirically estimate the multimarket contact effect by structurally analyzing suppliers' participation and pricing decisions.

3 - Channel Coordination via Nonlinear Pricing under Price Expectation

S.Chan Choi, Associate Professor, Rutgers Business School, 180 University Ave, Newark, NJ, 07102, United States, chanchoi@rci.rutgers.edu

A number of studies have suggested quantity discount as a mechanism to achieve incentive-compatible coordination between a manufacturer and his retailer. Using an incentive compatible pricing strategy, an upstream channel member can influence its downstream partner's behavior to reach Pareto optimality without coercion. We model channel coordinating pricing when the members expect changes in the final price, and derive a generalized nonlinear pricing schedule for channel coordination.

4 - Bundling and Unbundling of Electronic Content

Nevena Koukova, Assistant Professor of Marketing, Lehigh University, 621 Taylor Street, Bethlehem, PA, 18015, United States, nkoukova@lehigh.edu, PK Kannan, Brian Ratchford

Content providers such as publishers of books and newspapers have started to offer products in electronic form in addition to their print products. In this paper we investigate the attractiveness of product lines of items available in conventional and electronic form, and develop a profit-maximizing configuration of products and prices.

Wednesday, 10:00am - 11:30am

■ WB02

S-Tang I

DEA Research in Taiwan

Cluster: Data Envelopment Analysis

Invited Session

Chair: Shinn Sun, Associate Professor, China University of Technology, No 56 Section 3 Xing-Long Road Wen-Shan, Taipei, 11695, Taiwan, shinn.sun@msa.hinet.net

1 - A Meta Study of Data Envelopment Analysis

Yi-Kang Chen, Graduate Student, Aletheia University, No. 32, Chen-Li Street, Tamsui, Taipei, Taipei, +8, 251, Taiwan, allan@ms81.url.com.tw, Shinn Sun

Since Charnes et al. (1978) developed Data Envelopment Analysis (DEA), none of previous research has provided a comprehensive review of DEA on its evolution from 1996-2005, based upon selected journal articles. Therefore, it is important for this study to conduct a meta study of DEA. The purpose of this study is three-fold: (1) to map the evolution of DEA; (2) to assess research productivity on DEA by researcher, institution, and country; and (3) to present a summary of DEA applications.

2 - Agricultural Productivity and Productivity Growth in OECD and Non-OECD Countries

Peng Li Huang, Graduate Student, Aletheia University, No. 32, Chen-Li Street, Tamsui, Taipei, Taipei, +8, 251, Taiwan, 0928fox@yahoo.com.tw, Shinn Sun

Sea level is arising and available land for farming is limited, so an agriculture department of a nation needs to assess an issue of how farmers use limited resources to produce agr. productivity. This study's purpose is four-fold: to assess the productivity of OECD and Non-OECD Countries; to compare the agr. productivity OECD Countries with non-OECD countries; to examine productivity growth of the OECD and non-OECD Countries; and to assess the effect of environmental factors on agr Productivity

3 - The Performance and Productivity Growth of Taiwanese Banking Industry

Ying Yu Chou, Graduate Student, Aletheia University, No.32,Chen-Li Street,Tamsui,Taipei, Taipei, +8, 251, Taiwan, bluesnow0119@yahoo.com.tw, Shinn Sun

Banking industry is one of the most important service industries in Taiwan. Due to the governmental deregulation policy of bank establishment, many private banks are emerged. And some banks are merged because of market competitiveness and poor performance. The purpose of this study is three-fold: (1) to assess the performance of Taiwanese Banking Industry over 2001-2005 (2) to examine productivity growth of the banking industry; and (3) to examine the effect of environmental factors on bank performance.

4 - Performance in Land Offices of Taipei and Kaohsiung Direct-controlled Municipalities in Taiwan

Yung Chiang Chang, Taiwan, Aletheia University,
32 Chen-Li Street, Tamsui, Taipei, Taiwan, Taipei, +8, Taiwan,
a198103080116@yahoo.com.tw, Shinn Sun

Land office is one of governmental organizations and is responsible for proceeding transformation of land property. The governments of Taiwan need to examine how their land offices are using the government budgets in delivering efficient services. The purpose of this study is two-fold: (1) to assess the performance of land offices of Taipei and Kaohsiung Direct-controlled Municipalities over 2000-2004; (2) to examine the effect of environmental factors on land office performance.

WB03

S-Ballroom A

Behavioral Issues of Information Security

Cluster: Information Security
Invited Session

Chair: Hyeun-Suk Rhee, University of Texas, Dallas,
sukrhee@utdallas.edu

1 - Theory of Action and Interpreting Information Systems Security Implementation

Gurpreet Dhillon, Department of IS, Virginia Commonwealth University, School of Business, 1015 Floyd Avenue, Richmond, VA, 23284-4000, gpdhillon@comcast.net

Human factors have been considered to play a significant role in the management of information system security. In the literature such human factors are considered as repertoires of behavior that evolve from the reasoning and actions that individuals follow. These actions become the 'theories of action' individuals espouse and their 'theories-in-use', which are the actions they actually use. We argue that IS security problems occur when an organization's 'espoused theory' and their 'theory-in-use' (what they actually do) are contradictory. It is important, therefore, that human factors be addressed in (IS) security. The current focus on technological methods alone is an incomplete solution. The purpose of this paper is to present double loop learning as a strategy for designing and implementing security actions that bring an organization's 'espoused theory' and their 'theory-in-use' (what they actually do) into congruence. Indeed, by doing so double loop learning is a proactive security method that never becomes outdated.

2 - Framework for Comparing Pandemic Flu's with other Major Disasters Uncertainty

Tanya Tantalo, State University of New York, Buffalo, Buffalo, NY, 14260, ttantalo@buffalo.edu, Raj Sharman, H.R. Rao, Shambhu Upadhyaya

Our nation continuously faces threats from a variety of disasters, such as hurricanes pandemic flu, etc. Each disaster requires different activities related to preparedness, mitigation, response, and recovery. This paper develops a framework for comparing the different types of disasters in terms of preparedness, mitigation, response and recovery.

3 - Information Security Self Efficacy: Its Role in Risk Management Behavior

Hyeun-Suk Rhee, University of Texas, Dallas,
sukrhee@utdallas.edu, Cheong-Tag Kim

Self efficacy has been found an important belief which motivates and regulates one's behavior. In this study, we discuss the role of individual's belief on their competence on protecting their information and information systems in actual risk management behavior. We also discuss the antecedents of self efficacy in information security context.

4 - People and Data on the Move: Information Security in Virtual Work Environments

Mary Beth Watson Manheim, University of Chicago at Illinois,
mbwm@uic.edu, Hyeun-Suk Rhee

An important, but little researched, consequence of organizational virtuality is increased vulnerability of information. More and more employees are mobile, moving between geographic locations, even countries, and working at unsecured locations, e.g., home, airport and hotel, or Internet cafes. This study discusses virtual work environments and associated information security issues.

WB04

S-Ballroom B

Supply Chain Decisions for Mass Customization

Cluster: Mass Customization in Manufacturing
Invited Session

Chair: Frank Piller, MIT Sloan School of Management, 50 Memorial Dr, E52-513, Cambridge, MA, 02139, United States, piller@MIT.EDU

1 - A Modeling Method to Evaluate Resource Levels for Product Mass Customization Decisions

Roberto Lu, Associate Technical Fellow, The Boeing Company, P.O. Box 3707, Mail Code: 19-FA, Seattle, WA, 98124-2207, United States, roberto.f.lu@boeing.com

It could be preferable to postpone customization decisions of a major investment in a long life cycle product such as commercial airplanes. Most commercial airplanes are produced in a system where resource demands and component due dates are carefully planned. This presentation discusses a method that seeks a better system performance by balancing levels of customizations and resource utilizations while keeping decision deadlines as close to the final product delivery due date as possible.

2 - Pre-allocating Available-to-Promise Quantity with Two Stochastic Programming Methodologies

Chien-Yu Chen, Assistant Professor, George Mason University, 4400 University Drive, MSN 5F4, Fairfax, VA, 22030, United States, cchen8@gmu.edu

This research considers a partitioned allocation policy that pre-allocates available-to-promise quantity into distinct buckets for stochastic demands over multiple customer segments and time periods. We formulate the problem as a two-stage stochastic programming model and explore both discretization-based and sampling-based solution methodologies to obtain the approximated optimal allocations. Simulation experiments are implemented to study solution quality and efficiency.

3 - Modeling the Benefits and Costs of Postponement for Order Specification Commitment

Zeng Vernon, Mr., HKUST, IELM Dept., HKUST, Clear Water Bay, Kowloon, Hong Kong, Hong Kong, vernon@ust.hk

With the product proliferation and volatile market fluctuation, many buyers tend to postpone order specification commitment in order to better match the demand and supply. In this paper, we try to study the benefits and costs of this buying practice. Essentially it provides the buyer with options to cope with market fluctuations. A model is developed to quantify value. Then models are developed to quantify the costs. Finally, sensitive analysis is conducted to derive managerial insights.

4 - Product Family Configure-to-Order Platforms for Product, Process and Logistics Decision Making

Jianxin (Roger) Jiao, Nanyang Technological University, School of Mechanical & Aerospace Engineering, SG, SG, Singapore, jiao@pmail.ntu.edu.sg, Petri Helo

An agent-based multi-contract negotiation system with an Internet-enabled CTO platform is outlined for SC coordination. It aims to integrate different Web-based services across companies, as well as various lifecycle issues of product fulfillment, into a collaborative web of interactive commerce. Support of collaborative customization over the Internet is based on a generic product family master model to achieve synergy of sales force automation, product design, manufacturing planning, and SCM.

WB05

S-Ballroom C

Supply Chain Contracting and Pricing

Cluster: Supply Chains
Invited Session

Chair: Fuqiang Zhang, Assistant Professor, University of California, Irvine, Merage School of Business, Irvine, CA, 92617, United States, fzhang@uci.edu

1 - Optimal Quantity Discount Schedules for Customers with Heterogeneous Demands

Rong (Rachel) Chen, University of California at Riverside, 146 Anderson Hall, Riverside, 92521, United States, rachel.chen@ucr.edu

The supplier's problem of designing a profit-maximizing quantity discount schedule becomes much more complicated when she faces customers who vary in size, since in order to induce smaller customers to take the discount, she must give up profit from the larger ones. This paper incorporates this trade-off into the problem of constructing both all-unit and incremental quantity discount schedules that maximize the supplier's profits, when her customers differ in their size.

2 - Information Asymmetry and Quality in Service Outsourcing

Fuqiang Zhang, Assistant Professor, University of California, Irvine, Merage School of Business, Irvine, CA, 92617, United States, fzhang@uci.edu, Justin Ren

Quality is a crucial factor in making service outsourcing decisions. To complicate matters, the outsourcer (i.e., buyer) usually does not have perfect information about her suppliers when making outsourcing decisions. This paper studies the buyer's outsourcing strategy where exists asymmetric information regarding the supplier's quality endowment.

3 - Demand Forecast Sharing in Supply Chains

Xiaohang Yue, University of Wisconsin-Milwaukee, P.O. Box 742, Milwaukee, WI, 53201, United States, xyue@uwm.edu

This paper examines the incentives for a retailer and a manufacturer in a two-level supply chain to share their forecast information.

4 - Contracting for Supply Flexibility under Asymmetric Information

Fuqiang Zhang, Assistant Professor, University of California, Irvine, Merage School of Business, Irvine, CA, 92617, United States, fzhang@uci.edu, Tianjun Feng

This paper studies a procurement problem in a supply chain that consists of two independent firms: a buyer and a supplier. The market demand faced by the buyer is uncertain and the supplier needs to make capacity decisions before demand is realized. The supplier's production cost is private information and the firms may have different salvaging capabilities. We derive the optimal procurement mechanism for the buyer and also identify simple mechanisms that perform well.

WB06

S-Sung I

New Strategies for Managing Production and Inventory

Cluster: Production-Inventory Systems

Invited Session

Chair: Saif Benjaafar, saif@me.umn.edu

1 - Near Optimal Inventory Transshipment Network Using Small Number of Links

Chung-Piaw Teo, National University of Singapore, Business Link, Singapore, Singapore, bizteocp@nus.edu.sg, Huan Zheng

Retailers at N locations would like to setup transshipment links to pool their inventories together. A complete transshipment network is clearly superior in this regard. However, the complete transshipment network is dense with $O(N^2)$ links. In this talk, we show the following result: If we are only interested in a near optimal design, then under some mild conditions on the demand distributions, $O(N)$ links suffice!

2 - The Implications of Process Flexibility Structures

Mabel Chou, National University of Singapore, 1 Business Link, BIZ 1, #04-08, Singapore, mabelchou@nus.edu.sg, Geoffrey Bryan A. Chua

We examine the performance of different flexibility structures using a bipartite graph in terms of expected profit, instead of the expected sales criterion used in existing literature. We discuss the value of various process flexibility structures including a dedicated structure, a fully flexible structure, and a partially flexible "chaining" structure.

3 - A Contest among Distributors Over who is the Better Newsvendor

Yigal Gerchak, Professor, Tel Aviv University, Department of Industrial Engineering, Tel Aviv, NA, 69978, Israel, ygerchak@eng.tau.ac.il

The evaluation and rewarding of vendors who manage inventories of items they sell (VMI) for their relative performance in forecasting demand. The policy examined awards a fixed bonus to the distributor with less overages (expiries) and underages. We analyze the resulting novel games between distributors. These contests turn out to lead to behaviors that differ from their non-competitive counterparts.

4 - Impact of Reduced Consumer Search Costs and Manufacturing Costs on Competitive Bundling Strategies

Vickii Shu Zhou, Johnson Graduate School of Management, Cornell University, Ithaca, NY, 14853, United States, sz44@cornell.edu, Srinagesh Gavirenni

In addition to its ability to provide a competitive advantage, product bundling has the dual benefits of reduced search costs for the consumer and lower production costs for the manufacturer. We characterize the impact of these effects on the profitability of bundling strategies. Further we analyze how these results change in the presence of uncertainties.

WB07

S-Sung Il

OR in Marketing and Sourcing

Cluster: Practice/ORMS in Practice

Invited Session

Chair: Gwangrim Yi, IBM Korea, ASEM Tower, Samsung-Dong, Gangnam-Gu, Seoul, NA, South Korea, gwangrim.yi@kr.ibm.com

Co-Chair: Jay Horton, Managing Director, Strategis Partners, 8 Canisius Close, Pymble, 2073, Australia, jay.horton@strategispartners.com.au

1 - Using IBM Solutions to Maximize Financial and Customer Loyalty Results While Minimizing Costs

Mark Ramsey, Global Data Analytics Leader, IBM Center for Business Optimization, mramsey@us.ibm.com

IBM's Center for Business Optimization has created a three dimensional approach to marketing optimization: Marketing Event Optimization, Customer Equity Lifetime Management, and In-direct Marketing Mix optimization. This session will share the power of using these solutions individually or together to maximize a company's marketing investment.

2 - Sense-and-Respond Marketing: Optimization Using Prediction Model

Gwangrim Yi, IBM Korea, ASEM Tower, Samsung-Dong, Gangnam-Gu, Seoul, NA, South Korea, gwangrim.yi@kr.ibm.com, Naoki Abe

Event-based marketing is usually designed and executed by experiences of marketers rather than by quantitative approaches. However, in case that there are rare experienced marketers, quantitative approaches can be combined effectively to get the maximum ROI. This session introduces a systematic approach called the Sense-and-Respond Marketing and its case study to optimize the event-based marketing integrating with the customer predictive model.

3 - The Strategic Agenda for Inter-Firm ORMS Practice

Jay Horton, Managing Director, Strategis Partners, 8 Canisius Close, Pymble, 2073, Australia, jay.horton@strategispartners.com.au

The rise of outsourcing, offshoring and global supply chain management present new challenges and opportunities for ORMS Practice. In this context, the application of ORMS requires an understanding of how to design effective contractual and relational arrangements between organizations. The Paper describes a case study involving a Decision Analysis of a major outsource.

4 - Perceived Quality of Internet-enabled e-Banking: An Empirical Study

Ziqi Liao, Department of Finance and Decision Science, Hong Kong Baptist University, Hong Kong, victor@hkbu.edu.hk

This paper empirically examines consumer perceptions of the quality of Internet-enabled e-banking. The results suggest that user-friendly website, transactions security, operations reliability, and prompt response to service requests are primary concerns. Commercial banks should continuously improve the existing systems and operations in order to encourage more consumers to use the Internet e-banking.

WB08

S-Ching

Reliability Modeling and Optimization

Cluster: Queueing Theory & Reliability Analysis

Invited Session

Chair: Yu-Hung Chien, Assistant Professor, Department of Statistics, National Taichung Institute of Technology, 129 Sec. 3, San-min Road, Taichung 404, Taichung, 404, Taiwan, yhchien@ntit.edu.tw

1 - Spare Ordering Policy for Replacement under the Rebate Warranty

Yu-Hung Chien, Assistant Professor, Department of Statistics, National Taichung Institute of Technology, 129 Sec. 3, San-min Road, Taichung 404, Taichung, 404, Taiwan, yhchien@ntit.edu.tw, Jih-An Chen

From the user's perspective, a spare ordering policy for replacement of a non-repairable product/one-unit system, which with finite useful life limit under rebate warranty, is developed. The spare unit for replacement is available only by an order and the lead time for delivering that spare is random.

2 - Optimal Inspection Policy under non-Markovian Shock Model

Jih-An Chen, Assistant professor, Department of Business Administration, Kao-Yuan University, 1821, Chung-San Road, Lu-Chu Hsiang, Kaohsiung, Taiwan, jachen@cc.kyu.edu.tw, Jun-er You

The main goal of this research is to develop an inspection policy for the joint determination of both risk balance and homogeneous reliability of lot-sizing production system. This production process has a general deterioration distribution with increasing failure rate. Rather than develop a non-Markovian shock model, we focus on a quantile-based reliability model. This research will also provide a strategy of inspection based on the economic production quantity.

3 - Statistical Inference for Steady-State Availability of a Repairable System

Jau-Chuan Ke, Professor, Department of Statistics, National Taichung Institute of Technology, 129, Sec. 3, San-min Road, Taichung, 404, Taiwan, jauchuan@ntit.edu.tw, Yunn-Kuang Chu

This talk we consider the steady-state availability, denoted A , of a system assuming distribution-free failure and repair times is considered. We are interested in constructing a lower confidence bound and a testing framework for A .

4 - Bayesian Analysis for a Redundant Repairable System with Imperfect Coverage

Ssu-Lang Lee, lecturer, Department of Accounting, National Taichung Institute of Technology, 129, Sec. 3, San-min Road, Taichung, 404, Taiwan, sllee@ntit.edu.tw, Jau-Chuan Ke

System characteristics of a redundant repairable system with two primary units and one standby are studied from a Bayesian viewpoint with different types of priors assumed for unknown parameters, in which the coverage factor is the same for an operating unit failure as that for a standby unit failure.

5 - Agent-base of Vehicle Routing and Dispatching System for Logistics

Jun-er You, Lecturer, Department of Business Administration, Kao-Yuan University, 1821, Chung-San Road, Lu-Chu Hsiang, Kaohsiung, Taiwan, youjun@cc.kyu.edu.tw

Transportation cost gradually plays an important role in industries, reducing delivery cost and delivery time and satisfying customer. The information of vehicle dispatching, shipping content and routing can be used GIS, GPS, GPRS to track and show vehicle location. In this study, integrating the method of Agent and wireless information technology, linking vehicle tracking system, analyzes real time data to reach target indices, minimizes cost and time and balance working time assignment.

WB09

S-Ming I

Job Shop Scheduling

Contributed Session

Chair: George Kyparis, Professor, Florida International University, Dept. of Decision Sciences & Info Syst, University Park, Miami, FL, 33199, United States, kyparis@fiu.edu

1 - Heuristic for Flow Shop Scheduling with Identical Parallel Machines

Chinyao Low, professor, Industrial Engineering/Da-yeh University, Taiwan, #112 Shan-Jiau Road, Da-Tsuen, Changhua, Da-Tsuen, Changhua, 51505, Taiwan, chinyao@mail.dyu.edu.tw

This study aims to optimize the flowshop scheduling problems of identical parallel machines with dependent setup times by minimizing the total flow time. First, the 0-1 integer programming is used to construct the exact mathematical model for such a problem. Second, a SATS heuristic algorithm based on simulated annealing is developed to obtain a near optimal solution in a reasonably short period.

2 - An Object Oriented Model for Simulation of Job-shop Scheduling Problems

Bibhushan, Mr., IIT Delhi, Mech. Engg. Dept. IIT Delhi, Hauz Khas, New Delhi, 110016, India, bibhushan_iitd@rediffmail.com

An object oriented model for simulation of job-shop scheduling problems has been presented in this paper. This model is capable of developing a simulation model for a wide variety of job-shop layouts like permutation flow-shops, non permutation flow-shops, flow-shops with parallel processors, flow-shops with multiple product sequences, etc. This model could be easily integrated with any other heuristic or meta-heuristic to find the optimal solution of the job-shop scheduling problems.

3 - Closed Form Solution for Release Times in the F2 Deteriorating Job/ Sum wjCj pb

Edouard Wagneur, Professor, Ecole Polytechnique de Montréal, GERAD, HEC, 3000 chemin de la C, Montreal, PQ, H3T 2A7, Canada, Edouard.Wagneur@gerad.ca, T.C. Edwin Cheng, Daniel Ng

We study a flow-line covering a wide range of situations: plastic molding, steel milling, machine maintenance, etc. where the duration of a task performed on a job is a monotone non-decreasing function of the time the job spent in the system. Our model is set in a deterministic environment, with the initial conditions (i.e. release times of the jobs) as control parameters. Restricting to the 2-machine case for simplicity, we prove a closed form formula for the optimal release times of the jobs for the minimum weighted sum of completion times of a finite sequence of jobs.

4 - Algorithms with Performance Guarantees for Flow Shops with Regular Objective Functions

George Kyparis, Professor, Florida International University, Dept. of Decision Sciences & Info Syst, University Park, Miami, FL, 33199, United States, kyparis@fiu.edu, Christos Koulamas

We consider flow-shop scheduling with regular objective functions such as the minimization of makespan with arbitrary precedence constraints, the weighted sum of job completion times with series-parallel precedence constraints, the discounted total weighted completion time, and the sum of the quadratic job completion times. We present algorithms with tight worst-case performance bounds for all of these problems by utilizing the optimal permutations for the corresponding single-machine problems.

WB10

S-Ming I

Techniques on Optimization

Contributed Session

Chair: Cui Jinchuan, Professor, Operations Research Society of China, Inst Applied Math Beijing, Beijing, China, cjc@amss.ac.cn

1 - Application of Stochastic Optimization to the Problem of Recovery and Purification of Bio-Chemicals

Fattaneh Cauley, Associate Professor, Pepperdine University, Seaver College, 24255 Pacific Coast Hwy, Malibu, CA, 90263, United States, fattaneh.cauley@pepperdine.edu

Simulated moving bed (SMB) chromatography is an efficient separation technique that is widely used for the recovery and purification of bio-chemicals and pharmaceuticals. The mathematical programming model developed for SMB is highly non-convex and includes a large number of variables. This research investigates the application of stochastic optimization for solving the SMB design problem.

2 - An MILP Approach to a Nonlinear Pattern Classification of Data

Hong Seo Ryoo, Assistant Professor, Korea University, Industrial Systems and Information Eng., 1, 5-Ka, Anam-dong, Sungbuk-ku, Seoul, 136-701, South Korea, hsrwoo@korea.ac.kr, Kwangsoo Kim

We present an MILP model that for implementing a simple and accurate nonlinear decision surface that best separates data on hand. The classification of artificial and benchmark machine learning data demonstrates the major strength of the proposed model and shows that the data separation via the proposed MILP model is an effective supervised learning methodology that compares quite favorably to well-established learning methodologies.

3 - Graphic Solution on n-dimensional Loading Problem

Youkang Fang, Professor, Dr., Shengyang Ligong University and University of Botswana, Faculty of Science, Shenyang Ligong Univ., P/Bag0022, Gaborone, Botswana, Shenyang, 110168, China, fykfyk2004@yahoo.com.cn

Loading Problem is a n-dimensional linear or integer programming with two (volume and weight) constraints. To find its minimal value and minimal solutions, a graphic method using two-dimensional graphic techniques is presented.

4 - Timetabling and Grouping of Project Presentations of Student Teams

Burcin Bozkaya, Asst. Professor, Sabanci University, Faculty of Management, Orhanli, Tuzla, Istanbul, 34956, Turkey, bbozkaya@sabanciuniv.edu, Can Akkan

A common task we face in a course taught at Sabanci University is to group teams of students and schedule presentation time slots. Because the number of registered students makes this task non-trivial, we resort to an IP-based model. The criteria we use include homogeneity across time slots in terms of student background, and homogeneity within time-slots in terms of presentation material. We present our model, discuss alternative solution methods, and present some computational results.

5 - A Kind of Exploration Problem with N Vehicles: Modeling and Optimize Algorithms

Cui Jinchuan, Professor, Operations Research Society of China, Inst Applied Math Beijing, Beijing, China, cjc@amss.ac.cn, Li Xiaoya

This paper has three parts. First, by modeling; we transform the exploration problem to a scheduling problem. Second, we analyze the algorithms' complexity of the problem, and consider it a NP Problem. We give a special instance and optimal algorithm with time complexity of $O(n^2)$. Then we give the changing rule of the complexity from special instance to common case. Third, we give a heuristic algorithm with time complexity of $O(n^2)$. Examples are solved and the approximate rate is all above 95%.

WB12

S-Celestial Court-Jade

An Editorial Panel: Perspectives on Publishing in Scholarly Research Journals

Cluster: Special Sessions
Invited Session

Chair: Michael K. Badawy, Professor, Virginia Tech, P.O.Box 2931, Merrifield, VA, 22116, United States, mbadawy@vt.edu

1 - An Editorial Panel: Perspectives on Publishing in Scholarly Research Journals

Moderator: Michael K. Badawy, Professor, Virginia Tech, P.O.Box 2931, Merrifield, VA, 22116, United States, mbadawy@vt.edu,
Panelists: Patrick Chau, Univ. of Hong Kong; Jianmin Jia, The Chinese Univ. of Hong Kong.

This panel session is an excellent opportunity for researchers and scholars to learn more about the nature and dynamics of scholarly publishing. It will focus on providing perspectives on various issues relating to publishing in scholarly research journals. Each of the four journal editors will discuss the thematic orientation and scope of their respective journal. The topical research issues, manuscript handling protocol, the nature and process of the review cycle, and the decision making scheme relating to the final disposition of submissions will be explored. The procedure for manuscript revisions will also be discussed. Guidelines and tips that editors can provide for helping authors enhance the quality of their submissions, and potential acceptance of their articles will be presented. Questions and issues raised by session's participants will also be addressed

WB13

S-Celestial Court-Pearl

Issues in Supply Chain and Logistics

Contributed Session

Chair: Devanath Tirupati, Professor, Indian Institute of Management Ahmedabad, Wing 3 IIM A, Vastrapur, Ahmedabad, gu, 380015, India, devanath@iimahd.ernet.in

1 - A Study on the Dynamic Location Routing Problem (D-LRP) Applying the Ant-colony Optimization

Takako Sorimachi, Research Associate, waseda university, 3-4-1 Okubo Shinnjuku-ku, Shinjuku, 169-8555, Japan, sori@aoni.waseda.jp, Kazuho Yoshimoto

D-LRP problems are defined to decide the optimal number and location of the distribution centers(DCs) with the vehicle routing so as to minimize the total costs. In real-world, demand is not static. In addition, logistics cost is important as management strategy. Hence the number and location of the DCs need to be considered the best solution in whole-period. This paper applied the D-LRP solution with ant-colony algorithm as an optimization method for multi-period dynamic model.

2 - A Multiple Criteria Decision Model for Inventory Classification

Kevin W. Li, Assistant Professor, University of Windsor, Odette School of Business, 401 Sunset Ave, Windsor, ON, N9B3P4, Canada, kwli@uwindsor.ca, Ye Chen, Keith W. Hipel, D. Marc Kilgour

A case-based distance model is put forward to classify inventory according to multiple criteria. Unlike the traditional ABC analysis for inventory classification, which is based solely on annual dollar usage of a stock keeping unit (SKU), this easy-to-use procedure considers several criteria in determining which group an SKU should belong to. A case study demonstrates that this approach provides a reasonable classification result.

3 - Asymmetric Monetary Policy Effects on Firms' Inventory Dynamics in Friction Capital Market

Xiaolou Yang, PhD, The University of Texas at Austin, 2501 Lake Austin Blvd. Apt. E201, Austin, TX, 78703,

United States, honglou66@yahoo.com

I examined the effects of monetary policy on firms' inventory dynamics by developing a structure inventory model embedded with financial frictions. I found strong evidence of financial factor for the firms without access to public debt market, but little effect on the firms have easy access to public debt market. This conclusion is robust to a wide range of econometric specification and estimation techniques.

4 - Contracting for Long-term Supply Capacity in the Presence of Spot Market

Zhan Pang, Chinese University of Hong Kong, The Department of SEEM, HK, HK, China, zpang@se.cuhk.edu.hk

We consider a simple supply chain which consists of two make-to-stock manufacturers in the presence of spot market. The supplier produce commodity and sell the product in two channels' spot market and long-term contractual channel; the buyer can procure from both the long-term contractual channel and the spot market. We show that how the long-term capacity contract can be designed and evaluated by the two parties respectively, and then discuss the economics equilibriums under different contract mechanisms.

5 - A Modeling Approach for Operational Decisions in a Competitive Auto Component Replacement Market

Devanath Tirupati, Professor, Indian Institute of Management Ahmedabad, Wing 3 IIM A, Vastrapur, Ahmedabad, gu, 380015, India, devanath@iimahd.ernet.in, Pankaj Chandra, Nimit Jain

We consider operational decisions of firms in a competitive market such as an Indian Auto Component Replacement. The market is characterized by three types of players-original equipment suppliers, regional suppliers of non-original equipment and national suppliers of non-original equipment. We develop a game theoretic model to capture the key features of these players and examine process technology, performance quality and price choices at firm level.

WB14

S-Celestial Court-Coral

Healthcare Quality II

Cluster: Health Applications - Joint Invited/Sponsored

Chair: James C. Benneyan, Northeastern University, 360 Huntington Avenue, Boston, MA, 02115, United States, benneyan@coe.neu.edu

1 - Diffusion and Performance Impacts of Quality Management in American and Taiwanese Hospitals

Michael A. Counte, Professor, Saint Louis University, Department of Health Management & Policy, 377 Salus Center, 3545 Lafayette Avenue, St. Louis, MO, 63104-1314, United States, countem@slu.edu, Shien Guo, Grace Lin, James Romeis, Steven Meurer

Implementation of organizational initiatives based on Quality Management (QM) principles and methods has continued to globally accelerate in health care. This paper reports results from on-going comparative analyses of hospitals in the US and Taiwan using a Quality Management Scale and a model of key performance assessment variables developed and utilized by the authors. Preliminary findings indicate widespread diffusion of QM and impacts within and across the two societies.

2 - Risk-Adjusted Sequential Probability Ratio Tests for Non-Homogeneous Dichotomous Events

James C. Benneyan, Northeastern University, 360 Huntington Avenue, Boston, MA, 02115, United States, benneyan@coe.neu.edu, Aysun Taseli

SPRT's are developed based on a mixed-risk probability model for non-identical dichotomous events and applied to adverse healthcare events. Properties of these SPRT's and corresponding Cusum's are investigated and compared to those under i.i.d. assumptions. Results are extended to the weighted case where outcomes may receive unequal weights.

WB15

S-Celestial Court-Amber

Multicriteria Optimization

Contributed Session

Chair: Chin-I Chiang, Assistant Professor, Hsuan Chuang University, No. 48, Hsuan Chuang Rd., Hsinchu, 300, Taiwan, cchiang@hcu.edu.tw

1 - Multiple Objectives in Theory and Application

Dylan Jones, Principal Lecturer, University of Portsmouth, Buckingham Building, Lion Terrace, Portsmouth, PO1 3HE, United Kingdom, dylan.jones@port.ac.uk, Mehrdad Tamiz

This seminar will examine several applications with multiple objectives and look at how solutions have been generated and proposed. Examples from healthcare, simulation, inventory control, and logistics will be presented. Goal programming and compromise programming models will be built and discussed.

2 - The Multiobjective Faculty Assignment Problem - How We Solved it

Wolf Wenger, Lehrstuhl für Industriebetriebslehre, Universität Hohenheim, Stuttgart, 70593, Germany, w-wenger@uni-hohenheim.de, Martin Josef Geiger

We present the resolution of a real world problem, where students have to be assigned to scientific topics which are proposed and supported by members of staff. The problem involves the optimization under given preferences of students for certain topics using a metaheuristic approach. A multiobjective extension was made by integrating other objective functions in order to e.g. simultaneously balance the workload of the members of staff while maximizing overall utility of the students.

3 - Bicriteria Travelling Salesperson Problem

Özgür Özpeynirci, Researcher, TÜBYTAK, Atatürk Bulvarı No: 221, Kavaklıdere, Ankara, 06100, Turkey, ozgur.ozpeynirci@tubitak.gov.tr, Murat Köksalan

In most TSP applications, a single criterion is used. In many situations it may be more meaningful to consider more than one criterion. In this paper, we address the bicriteria TSP of minimizing the total tour length and the bottleneck arc length. We study the properties of efficient solutions and develop bounds on the number of efficient solutions. We also attempt to develop heuristic procedures to generate approximately efficient solutions.

4 - A Multi-Criteria Evolutionary Algorithm for Generating the Efficient Frontier

Banu Soylu, Research Assistant, Middle East Technical University, Cankaya, Ankara, 06531, Turkey, bsoylu@metu.edu.tr, Murat Köksalan

We develop an evolutionary algorithm to approximate the efficient frontier in Multi-Criteria Problems. The algorithm tries to generate solutions that are both close to the efficient frontier and well-spread in order to approximate the frontier well. To achieve this, each member selects its own weights for a weighted Techebycheff distance function that defines its fitness score. We compare our algorithm with NSGA II on various continuous test problems having different number of criteria.

5 - On the Multiple-Objective Linear Production Games with the Concept of Resource Allocation

Chin-I Chiang, Assistant Professor, Hsuan Chuang University, No. 48, Hsuan Chuang Rd., Hsinchu, 300, Taiwan, cchiang@hcu.edu.tw

This research aims to analyze a linear production games problem in which multiple decision-makers have resource bundle and produce collaboratively several kinds of products in a multiple-objective environment. Our approach in this research is to apply de-novo programming method to look for an optimal allocation of the resources by trading their resources, improving or at least maintaining the individual optimal benefits of each player.

WB16

S-Amethyst

Issues in Facilities Planning and Design

Contributed Session

Chair: Mieko Moki, Researcher, Fujitsu Research Institute, 16-1, Kaigan 1-Chome, Minato-ku, New Pier Takeshiba South Tower The 11th, Tokyo, 105-0022, Japan, moki@jp.fujitsu.com

1 - A Modern Production Floor Design for Manufacturing High-Value Part Overseas

Vu Tran, Senior Director of Engineering, NDS, 3500 Hyland Avenue, Costa Mesa, CA, 92626, United States, vtran@nds.com, Hugo Latapie

3rd - party production floor is protected with extended physical and computerized security. To further strengthen the security of the production floor, we propose the creation of a connected customer-control secure area to strengthen discriminated access onto the production floor. Our proposal aims to help 1) the manufacturer to reduce the frequency of customer accesses on the production floor, and 2) the customers hiding more of their systems from their competitors.

2 - Linear Programming Based Heuristic Approach to Solve Quadratic Assignment Problem

Surya Singh, Research Scholar, IIT Kanpur, Dept. of IME, IIT Kanpur, Kanpur, 208016, India, sprsingh@iitk.ac.in, Rrk Sharma

This paper presents a heuristic, including a "LP (Linear Programming)" based heuristic and "two-pair exchange" search technique for solving Quadratic Assignment Problem (QAP). The LP based heuristic is based on Hungarian method. The LP based heuristic serves as a construction heuristic. An

improvement heuristic called "two-pair exchange" search technique is devised to obtain a better solution. A comparison between the optimal and heuristic solutions is given.

3 - Visual Modeling Tool for Process Industries

Mieko Moki, Researcher, Fujitsu Research Institute, 16-1, Kaigan 1-Chome, Minato-ku, New Pier Takeshiba South Tower The 11th, Tokyo, 105-0022, Japan, moki@jp.fujitsu.com, Tomoaki Miyazaki, Susumu Ikenoue

This paper describes a visual modeling tool for business planning, production planning and distribution planning of the process industry using LP. This tool offers easy and quick planning work environment. It is possible for end-user to do simulation in various scenarios in a moment. The feature of this tool is "LP model automatic creation function" to define LP model, by drawing production process and distribution process directly on Excel. Excel environment is very acceptable for end-user.

WB17

H-Crystal Room 1

Transportation Planning and Operations II

Sponsor: Transportation Science & Logistics
Sponsored Session

Chair: Hong Lo, Department of Civil Engineering, Hong Kong University of Science and Technology, Clear Water Bay, Hong Kong, China, cehklo@ust.hk

1 - A Multi-Class Reliability-Based Stochastic User Equilibrium Transit Assignment Model

Liu Yang, Department of Civil and Structural Engineering, The Hong Kong Polytechnic University, 03902295r@polyu.edu.hk, Haiyang Yu, William Lam

This paper proposes a multi-class reliability-based stochastic user equilibrium transit assignment model for congested transit networks with uncertainty. The proposed model would explicitly consider the effects of transit service reliability on risk-averse and risk-taking passengers' route choice behaviors. The congestion impacts such as elastic transit line frequencies and passenger overload delays are also taken into account in the proposed model.

2 - Applications of a Dynamic Traffic Assignment Model

Michael Florian, CRT, University of Montreal, P.O. Box 6128, Station C.V., Montreal, QC H3C3J7, Canada, mike@crt.umontreal.ca, Michael Mahut

We present recent computational experience with a dynamic traffic assignment model that solves the dynamic traffic equilibrium model on medium and large size networks. The applications presented originate in Canada, USA and Europe. The algorithm used employs a microsimulation for the network loading and a projected gradient method for the flow allocation to the chosen paths. Calibration results are given in detail.

3 - Differences Among Route Flow Solutions for the User-Equilibrium Traffic Assignment Problem

Hillel Bar-Gera, Ben-Gurion University, P.O.Box 847, Beer-Sheva, Israel, bargera@bgu.ac.il, Amos Luzon

Analyses of route flows from user-equilibrium (UE) models are fairly common, despite the well known problem of non-unique solutions. New methods were recently developed for finding the entropy maximizing route flow solution under the user-equilibrium assumption (MEUE) as well as for generating other alternative route flow solutions. In this talk we will present the principles of the MEUE algorithm, as well as the differences among UE route flows solutions and their practical implications.

4 - Stochastic Programming and the Option of doing it Differently

Stein W. Wallace, Professor of Quantitative Logistics, Molde University College, P.O.Box 2110, NO-6402 Molde, Norway, Stein.W.Wallace@hiMolde.no

Option theory and stochastic programming are tightly linked. Most options can be analyzed in both frameworks, and the two approaches support each other in many slightly more complex situations. But this similarity hides some central differences in perspective. This short note tries to focus on one of these, namely the fact that option theory can be applied only to options already identified, while stochastic programming is able to help us find options in contexts where it is not at all clear what they are, and where finding might be more important than valuing.

■ WB18

H-Crystal Room 2

Facility Location and Urban Transportation

Sponsor: Location Analysis
Sponsored Session

Chair: Tsutomu Suzuki, Professor, University of Tsukuba, 1-1-1
Tennodai, Tsukuba, Ib, 3058573, Japan, tsutomu@risk.tsukuba.ac.jp

1 - A Study on Evaluation of Disaster Risks and Response Capability for Safe City Realization

Yeong Kim, Professor, Gyeongsang National University, Chinju,
South Korea, yeongkim@nongae.gsnu.ac.kr

We have recently more interests in discussion about how to guarantee to urban services for risk prevention and accident treatment. We evaluate basic indicators such as risks and response capabilities for the urban services. Three metropolitan areas are selected in Korea. A MADM technique and its weighting techniques such as ELECTRE and AHP are applied. The degree of risks and capabilities in the communities are also evaluated to respond to disasters to explore better urban policy alternatives.

2 - New Airport Impact Study Based on the Shortest Trip Time Between Cities in Japan

Hidetoshi Miura, Associate Professor, Meikai University, Meikai 8,
Urayasu, 2798550, Japan, hmiura@meikai.ac.jp

This paper deals with the prediction of effect of new airport for domestic trip in Japan. The object of this study is to offer the effective location point of airport that secures enough users. The new airport on candidate point is given some imaginary airlines judged real ones flying from neighboring airports. This estimation process is based on movement time including waiting time and transfer time, flight data, and population data.

3 - Minisum and Minimax Location Problems Considering Vertical Movement within High-rise Buildings

Ken-ichi Tanaka, Assistant Professor, Department of Management
Science, Kagurazaka 1-3, Shinjuku-ku, Tokyo, 1628601, Japan,
ken1@ms.kagu.tus.ac.jp

This paper proposes minisum and minimax location problems when demand points are distributed continuously along segments located perpendicularly on a plane with fine rectangular grid. A geometrical solution for a single facility location problem is presented. Extensions of this model are also investigated. The model is useful for examining the optimal facility location where customers are distributed along high-rise buildings.

4 - Extension of Commuting Assignment Problem Considering Transportation Modes and Density Limitations

So-Hee Lee, Graduate Student, University of Tsukuba,
1-1-1 Tennodai, Tsukuba, 3058573, Japan, shlee@sk.tsukuba.ac.jp,
Tsutomu Suzuki

The purpose of this paper is to find out how much the commuting time and energy consumption could be saved by considering transportation modes and density limitations. We examine the commuting assignment problem with allocating the number of jobs and housing to promote a use of public transportation that will achieve more energy-efficient than private transportation. Moreover several scenarios will be evaluated by controlling jobs and housing densities to suggest the optimal urban structure.

■ WB19

H-Crystal Room 3

Industrial and Mobile Applications of Web-Service

Cluster: Web-Service Related Technology
Invited Session

Chair: Chuan-Jun Su, Associate Professor, Yuan Ze University, No.
135 Yuan-Tung Road, Chungli, NA, Taiwan, iecjsu@saturn.yzu.edu.tw

1 - Hierarchical Case-Based Reasoning for Flight Simulator Maintenance System

Ching-Jung Ting, IEM Dept. Yuan-Ze University, 135 Yuan Tung
Road, Chung-Li, TA, Taiwan, ietingcj@saturn.yzu.edu.tw,
Pi-Tsan Lee

To provide reliable and effective maintenance support, it is important for the technician to utilize previous repair experience with the aid of advanced information technology. In case-based reasoning (CBR), solutions to new problems are obtained by finding similar cases and analyzing the solutions to those cases for the answer to the current one. To effectively retrieve similar cases, this research proposes a hierarchical CBR system to aid fault diagnosis of a flight simulator.

2 - Mobile Multi-Agent Based, Distributed Information Platform (MADIP) for Wide-Area e-Health Monitoring

Chuan-Jun Su, Associate Professor, Yuan Ze University, No. 135
Yuan-Tung Road., Chungli, NA, Taiwan, iecjsu@saturn.yzu.edu.tw

This research aims to design and prototype a mobile multi-agent based information platform - MADIP to support the intensive and distributed nature of wide-area e-health monitoring environment. To facilitate the development of the information platform, ASDK was adopted for prototyping, and concept-proofing.

3 - Design and Development of Dynamic VR Model for Visualization of ATO Products

Tien-Lung Sun, Associate Professor, Yuan Ze University,
135 Yuan-Tung Road, Chung-Li, Taiwan, tsun@saturn.yzu.edu.tw

It is impractical to build and maintain all the required VR models of a customized product. Recently dynamic VR model has been proposed. Several prototype systems have been developed to support dynamic 3D content delivery through the Internet. But the detailed VR model design is often ignored. To address this deficiency, this paper discusses the design and construction of a dynamic VR model suitable for assembly-to-order (ATO) products.

4 - A Design Task Distribution and Product Evaluation Model in a Collaborative Design Chain

Yuan-Jye Tseng, Professor, Yuan Ze University, 135 Yuan-Tung
Road, Chung-Li, Taoyuan County, NA, Taiwan,
iejyt@saturn.yzu.edu.tw

With the Internet and web-based computing technologies, the design activities can be distributed to different design teams located at different locations in a collaborative design chain. If the parts of a product are designed by different design teams, the value and the cost of the product may vary. This paper presents a model for distributing the design tasks for designing the parts of a product such that the total design cost can be minimized and the total design value can be maximized.

5 - An Ontology-Driven Interface Agent for Program Planning

Oscar Lin, Canada, oscarl@athabasca.ca, Steve Leung,
Chuan-Jun Su, Frank Zhang

This paper presents the design of an ontology-driven interface agent for using program planning and scheduling Services in Web-based education. The architecture of the interface agent and an ontology-based learner model are described. We show the effectiveness of the approach through giving an example application.

■ WB20

H-Jade Suite 1

Heuristic Methods

Contributed Session

Chair: Shu-Kai S. Fan, Professor, Yuan Ze University,
135 Yung-Tung Road, Chung-Li, Taoyuan County, 320, Taiwan,
simonfan@saturn.yzu.edu.tw

1 - A Heuristic Method for the Production Routing Problem with Time Window

Shu-Chu Liu, Department of Management Information Systems,
National Pingtung University of Science and Technology, 1 Hseuh
Fu Rd., Nei Pu, Pingtung, 912, Taiwan, sliu@mail.npust.edu.tw,
Chien-Yin Chen

The production routing problem with time window is to sequence customers' orders and to schedule vehicles' routes to meet customers' demands with time window. A heuristic method is proposed for this problem. The initial solution using the ant colony optimization approach is determined first. Then an improvement heuristic search is proposed and implemented. The simulation results show the proposed hybrid heuristic method is better than those existing methods in terms of total system cost.

2 - A New Search Heuristic for solving Binary Constraint Satisfaction Problems

Noureddine Bouhmala, Dr., Vestfold University College, Boks
2243, Tnsberg, N-3103, Norway, noureddine.bouhmala@hive.no

Solving constraint satisfaction problems (CSPs) involves finding an assignment of values to variables that satisfies a set of constraints. In this work, we describe an efficient search heuristic based on combining a local search algorithm with a dynamic weighting procedure to update the weights of the constraints each time the search gets stuck in local minima. The reported results on hard random binary CSPs demonstrate its efficiency in terms of solution quality and solving speed.

3 - An Enhanced Partial Search to Particle Swarm Optimization

Shu-Kai S. Fan, Professor, Yuan Ze University, 135 Yung-Tung Road, Chung-Li, Taoyuan County, 320, Taiwan, simonfan@saturn.yzu.edu.tw, Ju-Ming Chang

Particle swarm optimization (PSO) is an evolutionary, population-based optimization technique that has been successfully applied to a wide range of engineering problems in practice. This paper develops a variation on the conventional PSO, termed the enhanced partial search particle swarm optimizer (EPS-PSO) to improve the performance of the original algorithm. Computational results in terms of several benchmark functions justify a marked improvement in performance over the existing PSO algorithms.

WB21

H-Jade Suite 2

Strategic Marketing Plan

Contributed Session

Chair: Ted Klastorin, Professor, Univ of Washington, Box 353200, Dept. of Mgt Science, Seattle, WA, 98195-3200, United States, tedk@u.washington.edu

1 - The Rise and Fall and Rise of OR/MS

Maurice Kirby, Professor, Lancaster University, UK, Department of Economics, Lancaster Unive, Lancaster, LA1 4YX, United Kingdom, m.kirby@lancaster.ac.uk

This paper focuses on the Anglo-American debate on the future of OR/MS as articulated by academic members of the discipline in the quarter-century after 1970. The paper argues that predictions of the 'death' of OR/MS were fundamentally misconceived given the post-1980 trajectory of OR/MS in the form of external consultancy.

2 - Competitive Strategy to Counter E-Business Threats

Bryan Lo Ching Wing, Lecturer, Universiti Malaysia Sabah, Labuan International Campus, P O Box 80594, Labuan FT, 87015, Malaysia, lo38@tm.net.my

The marketplace indeed provides plenty of e-business opportunities, however there are many brick and mortar firms which do not find any advantages but instead, greater business threats in this market dimension. This paper analyses the e-business and marketplace environments and discusses some useful competitive strategies for brick and mortar firms to counter e-business threats.

3 - Planning Software Development Products in a Monopoly Market

Ted Klastorin, Professor, Univ of Washington, Box 353200, Dept. of Mgt Science, Seattle, WA, 98195-3200, United States, tedk@u.washington.edu, Param Singh

We consider a monopolist who introduces a new software product that has multiple versions during the product's finite life span. Customers enter the market over time according to a diffusion process based on the number of prior purchases, and purchase a product when their utility surplus is positive. The monopolist sets the design/quality and price for both versions as well as the timing of the upgrade's introduction. Using numerical examples, we describe our model and resultant implications.

Wednesday, 11:45am - 1:15pm**WC01**

S-Tang II

Quality, Statistics and Reliability II

Cluster: Quality, Statistics and Reliability - Joint Invited/Sponsored

Chair: Fu-Kwun Wang, Associate Professor, Dept. of Industrial Management, National Taiwan University of Science and Technology, No. 43, Keelung Rd., Sec.4., Taipei, 106, Taiwan, fukwun@mail.ntust.edu.tw

1 - The Application of Monte-carlo Method in the Reliability Calculation of Bus Travel Time

Fan Haiyan, School of Transportation Engineering, Tongji University, Room 25-502, Number 900, Guoshun-East Road, School of Transportation Engineering, To, Shanghai, 200433, China, fanhaiyan1975@163.com, yang xiao-guang

Based on the brief discussion of the importance of reliability for bus travel time-founded reliability model of bus travel time, used of monte-carlo stochastic analogy method, calculated reliability of bus travel time for one line. The results is very important for analyzing time reliability of bus line, which have fixed schedule under the condition of advanced public transportation system.

2 - Best Practices for Design and Innovation

Suraj Alexander, Professor, University of Louisville, Department of Industrial Engineering, Louisville, KY, 40292, United States, suraj.alexander@louisville.edu

We consider the product development process developed to enhance innovation by companies such as IDEO, that have received considerable publicity recently in publications such as Business Week, with existing popular approaches such as Design for Six Sigma (DFSS), Quality Function Deployment (QFD), and axiomatic design, in an attempt to glean best practices for both design and innovation.

3 - Design a Supply Network for Six Sigma

Fu-Kwun Wang, Associate Professor, Dept. of Industrial Management, National Taiwan University of Science and Technology, No. 43, Keelung Rd., Sec.4., Taipei, 106, Taiwan, fukwun@mail.ntust.edu.tw

To evaluate the delivery performance of a supply chain network, the supply chain process can be decomposed into detailed business processes. This paper investigates supply chain performance based on the capability index, Spk, which establishes the relationship between customer specification and actual process performance, providing an exact measure of process yield. Also, we propose a design for six-sigma for a supply chain network. A case study is used to demonstrate the proposed methodology.

4 - Decision Risk Analysis Considering Unreliable Forecasts

Zhongsheng Hua, Professor and Chairman, Dept. of Information Management & Decision Science, School of Management, University of Science and Technology of China, 96#JinZhai Road, Hefei, AH, 230026, China, zshua@ustc.edu.cn, Bin Zhang

Unreliable forecasts in uncertain environment will result in unfaithful risk characteristics, which affect decision risk under a given utility function and risk analysis technique. In this paper, we investigate the relationship between forecast unreliability and risk measures via stochastic dominance, and quantify the impact of unreliable forecast on decision risk.

WC02

S-Tang I

DEA Applications

Cluster: Data Envelopment Analysis

Invited Session

Chair: Hsihui Chang,, hsihui.chang@ucr.edu

Co-Chair: Shyr-Juh Chang, Associate Professor, Chihlee Institute of Technology, Department of Accounting Information, No: 313, Sec. 1, Wunhua Rd., Banciao City, TW, Taiwan, sjchang@mail.chihlee.edu.tw

1 - The Impact of TQIP on Health Care-Evidence from Taiwan

Shyr-Juh Chang, Associate Professor, Chihlee Institute of Technology, Department of Accounting Information, No: 313, Sec. 1, Wunhua Rd., Banciao City, TW, Taiwan, sjchang@mail.chihlee.edu.tw, Hsing-Chin Hsiao, Li-Hua Huang

We examine the operating efficiencies of hospitals joining the Taiwan Quality Indicator Project (TQIP). First, applying DEA model, we focused on the health care quality factor impact to the efficiency of hospitals participating in the TQIP, and on the differences between public and private hospitals. Second, we analyze changes in the productivity and quality indices, as measured by the Malmquist Index, and explore the differences pre- and post- TQIP adoption.

2 - Quality Activity Performance Evaluation

Li-Hua Huang, Assistant Professor, National Taipei College of Business, #321, Sec. 1, Chi-Nan Rd., Taipei, TW, Taiwan, dbacpa@webmail.ntcb.edu.tw, Shyr-Juh Chang, Hsing-Chin Hsiao

We explore the quality efficiency of a military plant in Taiwan. The DEA method is utilized to analyze the relative efficiency. Tobit regression analysis is also used to capture the critical factors influencing the quality efficiency. There are several results from our study. Our study not only exhibits the quality efficiency recognitions but also demonstrates a mechanism to improve the resource allocation policy for the military plant.

3 - Cost Analysis and Process Improvement

Hsing-Chin Hsiao, Associate Professor, National Taipei College of Business, Department of Accounting Information, #321, Sec. 1, Chi-Nan Rd., Taipei, Taiwan, thinking@webmail.ntcb.edu, Shyr-Juh Chang, Li-Hua Huang

This paper aims to explore the improvements in operation efficiency and activity at a natural gas company in Taiwan. We applied factor analysis to distinguish each activity center, and labeled each center according to its different cost hierarchy. In order to analyze the relative efficiency, a linear programming model of data envelopment analysis (DEA) method was utilized. The slack variable analysis was applied to detect the activity improvement.

4 - Productivity Change, Technical Progress and Relative Efficiency Change in the Public Accounting Industry of China - The Empirical Evidence on the CPA Firms of Shenzhen City

Bin Lin, mns1b@126.com, Ke-Ming Wang, Shan-Min Liu

We present evidence on components of productivity change in the public accounting industry of China toward the beginning of 21st century. Using revenue and human resource data from 214 CPA firms of the public accounting industry in Shenzhen for 2002-2004 period, we analyze productivity change, technical progress, and relative efficiency change over time. The public accounting firm experienced a much more productivity growth between 2002 and 2004. We find support for the development of the public accounting industry and that management advisory service (MAS) is efficient which bring more revenue for those CPA firms. We find productivity growth and present evidence on components of productivity change in the public accounting industry of China in the 2002-2004 periods. The public accounting industry in China went through a significant productivity change during the early 2000s. The productivity improvement was primarily due to technical progress in the industry production function, offset in part by a decline in relative efficiency. Compared with the developed countries, technical progress of the Chinese public accounting industry is not being represented significantly that CPA firms emphasis on MAS.

WC03

S-Ballroom A

Information Security Practices

Cluster: Information Security
Invited Session

Chair: Rayford Vaughn, Computer Science and Engineering, Mississippi State University, vaughn@cse.msstate.edu

1 - Internet Security Threat Data Collection and Analysis Using the Philippine Honeynet Project Infrastructure

Ryan Talabis, The Global Honeynet Project Research Alliance, UNDP, talabis@gmail.com

This study discusses the development of an internet security threat data collection and analysis mechanism using a Gen III honeynet. This honeynet infrastructure is used to gather and collect first-hand data (direct from the internet) on security threats such as worms, hacking attempts and other internet anomalies. The data, collected over a period of three months, is studied, presented and analyzed using a graphical chart-based analysis approach, utilizing custom tools and techniques developed in the course of the study. The given analysis period produced over thirty individual case-based studies that led to the discovery of new worm signatures, malware variants, and an analysis of other hacking activities. The study also includes a quarter's worth of long-term historical analysis of collected data.

2 - The Center for Computer Security Research at Mississippi State University

Rayford Vaughn, Computer Science and Engineering, Mississippi State University, vaughn@cse.msstate.edu

This presentation will describe the activities and research work ongoing within Mississippi State University's Center for Computer Security Research (CCSR) and how it was built over time since 1998. The research includes intrusion detection in high performance computing clusters, computer forensics, honeypots/nets, IA metrics, and attacks against HPC systems, vulnerability modeling, and sensor fusion.

3 - Homeland Security Program Portfolio Selection

Theodore Glickman, Professor, George Washington University, School of Business, Washington, DC, 20052, United States, glickman@gwu.edu

The U.S. Department of Homeland Security has established a policy of risk-based decision making. Implementing this policy requires tools for assessing risks, setting priorities, and determining risk reduction strategies. A portfolio selection approach is discussed in which alternative capabilities and programs for risk reduction are analyzed using goal programming.

4 - Security Analysis and Eavesdropping in Quantum Cryptography

Kashif Habib Sheikh, Assistant Professor, NED University of Engineering & Technology, Department of Computer Science & IT, Karachi, Pakistan, skashifh@yahoo.com, Syed Salahuddin Hyder

Quantum Cryptography is a new technique for the transmission of information whose security is guaranteed by the laws of physics. We analyze the key distribution protocol which restricts an eavesdropper and guarantees for no leakage of information. We discuss techniques to increase the detectability of an eavesdropper. The security against any attack allowed by the rules of Quantum mechanics is also considered.

WC04

S-Ballroom B

Mass Customization Business

Cluster: Mass Customization in Manufacturing
Invited Session

Chair: Roberto Lu, Associate Technical Fellow, The Boeing Company, P.O. Box 3707, Mail Code: 19-FA, Seattle, WA, 98124-2207, United States, roberto.f.lu@boeing.com

1 - Research on Personalized Customization Based on Interest Orientation Model

Zhanwen Niu, Tianjin University, No.92 Weijin Road Nankai Dist., Tianjin, 300072, China, zw.niu@163.com, Wei Guo, Xiaodan Zhang

In order to make the customized product closely meet the customer's real individualization, a model based on the customer interest orientation was proposed. The solution to engineering configuration corresponding to interest orientation was developed with the AHP and matrix theory. Three algorithms were used for the generation of product configuration. An example of application to bicycle customization was given, which proved the effectiveness of the proposed method.

2 - Collaborative Product Configuration

Songlin Chen, HKUST, A501B HKUST, Clear Water Bay, Kowloon, Hong Kong, songlin@ust.hk, Mitchell M. Tseng

Configuring complex products requires close collaboration between customers and manufacturers, who, however, usually have asymmetric information and conflicting preferences. Viewing from a negotiation perspective, this paper develops a process for collaborative product configuration so that manufacturers' constraints and customers' preferences can be explored and reconciled. A prototype negotiation support system is developed and an example for its application is demonstrated.

3 - Computerized Automotive Technology Reconfiguration System for Reverse Engineering & Mass Customization

Jianxin (Roger) Jiao, Nanyang Technological University, School of Mechanical & Aerospace Engineering, SG, Singapore, jjiao@pmail.ntu.edu.sg, Halimahtun Khalid, Martin Helander

This presentation reports a project sponsored by European Commission. With focus on the automotive industry, CATER is a design philosophy that showcases the best practices of networked business. While enhancing customer relationship management and supporting the needs of concurrent engineering teams, CATER demonstrates the need for a semantic driven system that ties together customers, designers and suppliers in a collaborative and mutually supporting endeavor.

WC05

S-Ballroom C

Cutting and Packing I

Cluster: Cutting and Packing
Invited Session

Chair: Horacio Hideki Yanasse, Researcher - PhD, INPE - National Institute for Space Research (Brazil), Avenida dos Astronautas 1758, INPE/CTE, São José dos Campos, SP, 12227-010, Brazil, horacio@lac.inpe.br

1 - A Hybrid Random Key Based Genetic Algorithm for the Container Loading Problem

José Fernando Gonçalves, Associate Professor, Faculdade de Economia do Porto, Rua Dr. Roberto Frias, s/n, Porto, 4200-464, Portugal, jfgoncal@fep.up.pt

This paper presents a hybrid genetic algorithm based on random keys for the container loading problem with boxes of different sizes and a single container for loading. A new fitness function and a new placement procedure are developed. Extensive computational tests on the benchmark problems including procedures from other authors validate the effectiveness of the proposed approach.

2 - A Tree-search Heuristic for the Container Loading Problem

Andreas Bortfeldt, Dr., University of Hagen, Profilstasse 8, Hagen, D, 58084, Germany, Andreas.Bortfeldt@FernUni-Hagen.de, Tobias Fanslau

We present a tree-search heuristic for the three-dimensional container loading problem that fills the container successively by blocks of identical boxes. Each block is determined by means of a limited foresight and a block is not changed once it has been selected. The heuristic achieves excellent results for the well-known benchmark instances of Bischoff and Ratcliff. Moreover some constraints of practical relevance are considered.

3 - Linear Models for One-group Two-dimensional Guillotine Cutting Problems

Horacio Hideki Yanasse, Researcher - PhD, INPE - National Institute for Space Research (Brazil), Avenida dos Astronautas 1758, INPE/CTE, S, o José dos Campos, SP, 12227-010, Brazil, horacio@lac.inpe.br, Reinaldo Morabito

We present integer linear and non-linear models to generate 1-group constrained and unconstrained two-dimensional guillotine cutting patterns, including exact and non-exact cases. To demonstrate the effectiveness of the proposed models, we compare them with models of the literature by solving a number of examples randomly generated and an actual example derived from a furniture company.

WC06

S-Sung I

Inventory and Production Planning

Cluster: Production-Inventory Systems
Invited Session

Chair: Edwin Romeijn, University of Florida, 303 Weil Hall, P.O. Box 116595, Gainesville, FL, 32611-6595, United States, romeijn@ise.ufl.edu

1 - A Multi-commodity Capacitated Inventory-Location Model

Ho-Yin Mak, Graduate Student, University of California, Berkeley, IEOR Department, 4141 Etcheverry Hall, Berkeley, CA, 94720, makho@berkeley.edu, Max Shen

We consider a multi-commodity supply chain design problem. We formulate a capacitated location-inventory problem that captures inventory risk-pooling effects at the distribution centers (DCs). Our definition of capacity is more flexible than the one adopted in traditional location models and considers the inventory level instead of the average demand processed by the DC. We present the solution approach, numerical results and some managerial insights.

2 - The Multi-facility Multi-retailer Newsvendor Problem

Edwin Romeijn, University of Florida, 303 Weil Hall, P.O. Box 116595, Gainesville, FL, 32611-6595, United States, romeijn@ise.ufl.edu, Zeynep Sargut

We consider a problem in which multiple newsvendors must be supplied by a set of capacitated facilities. The objective is to minimize the total transportation costs between facilities and retailers as well as the total expected overage and underage cost at the retailers. We develop effective algorithms for variants of the problem with and without single-sourcing constraints and under several different procurement and transportation cost structures.

3 - Collection and Recovery Planning for used Durable Products with Remanufacturable Parts

Elif Akcali, Assistant Professor, University of Florida, 303 Weil Hall, P.O. Box 116595, Gainesville, FL, 32611, United States, akcali@ise.ufl.edu, Ibrahim Karakayali

We analyze collection and recovery operations for end-of-life products in durable goods industries. We consider a durable end-of-life product from which several parts can be recovered and remanufactured for resale, and the remainder of the product can be recycled for material recovery. Both the supply of end-of-life products and demand for remanufactured parts are price-sensitive. We develop models to optimize the collection decisions in centralized and decentralized settings.

WC07

S-Sung II

E-Commerce and IT

Contributed Session

Chair: Guoqiang Tao, Beijing Document Service, 167 Mailbox, Beijing, China, wolftgq@126.com

1 - Demand Forecasting of the Two Technologies having Contingent Relation in Multi-generation

Jae Kang Lee, Yonsei University, 134 Shinchon-dong, Seodaemun-gu, Seoul, Seoul, South Korea, leojack@yonsei.ac.kr, So Young Sohn

Many studies related to the technology evaluation have examined a diffusion model for a next generation technology. However, most studies focused on only one technology in a multi-generation setting. In this paper, we consider the diffusion of two technologies having contingent relationship. First, we propose a contingent diffusion model for two contingent technologies. Next, we extend it to accommodate a multi-generation diffusion. Finally, we apply the proposed model to an empirical case and show superiority of our proposed approach.

2 - Verification and Validation of S&T Information

Guoqiang Tao, Beijing Document Service, 167 Mailbox, Beijing, China, wolftgq@126.com, Xuewen Xu

Scientific and technical information includes a variety of both formal peer-reviewed information such as reports, journal articles, and conference proceedings, and other forms of informal literature and knowledge, such as model software, presentations, data sets, and documents in repositories. When provided for customers, the information should be of enough credibility and applicability. For the purpose of improving credibility and applicability of S&T information, this paper compares the development processes of different kinds of S&T information and explores how Verification, Validation and Accreditation could be applied to S&T information development, includes corresponding procedures, administrative mechanisms, and V&V method.

WC08

S-Ching

Reliability and Queueing Applications

Cluster: Queueing Theory & Reliability Analysis
Invited Session

Chair: Jyh-Bin Ke, Associate Professor, National Chung-Hsing University, Taiwan, Dept. of A. Math., 250 Kuo-Kung Rd., Taichung, 402, Taiwan, jbke@amath.nchu.edu.tw

1 - Minimizing Mean Flow Time in a Two-machine Flowshop with Deteriorating Jobs

Wen-Chiung Lee, Professor, Feng-Chia University, 100 Wenhua Road, Taichung, Taiwan, wlee@fcu.edu.tw, Chin-Chia Wu

In many real production situations, jobs take longer times if they start later. This phenomenon is known as deteriorating jobs. In this paper, a two-machine flowshop deteriorating jobs problem is discussed where the objective is to minimize the mean flow time. A branch-and-bound algorithm and several heuristic algorithms are provided. Computational results are presented to evaluate the performance of the proposed algorithms. In addition, the impact of the deterioration rate is investigated.

2 - A Recursive Method for the Optimal Control of an M/G/1/K Queue with F Policy and Startup Time

Ching-Chang Kuo, PhD. Student, National Chiao Tung University, Dept. of Industrial Eng. & Management, Hsin Chu, Taiwan, john_kuo10@pchome.com.tw, Wen Lea Pearn, Kuo-Hsiung Wang

We study the optimal control of the F-policy M/G/1/K queue with startup time. We use the supplementary variable technique to develop the steady state probability distribution of the number of customers in the system. The method is illustrated analytically for exponential distribution. A cost model is established to determine the optimal F-policy at minimum cost. We use an efficient Maple computer program to evaluate the optimal value F and some system performance measures.

3 - Comparative Analysis of Series Systems with Standby Switching Failures and General Repair Time

Jyh-Bin Ke, Associate Professor, National Chung-Hsing University, Taiwan, Dept. of A. Math., 250 Kuo-Kung Rd., Taichung, 402, Taiwan, jbke@amath.nchu.edu.tw, Kuo-Hsiung Wang

This paper deals with a comparative analysis of three different series system configurations with warm standby components, where the standby components have switching failure probability. The time-to-failure and the time-to-repair of the components are assumed to be exponentially and generally distributed, respectively. We provide a recursive method, using the supplementary variable as the remaining repair time, to develop the steady-state unavailability, UAV, for three configurations.

4 - Firm Value Relevance of Corporate Governance - An Empirical Study of the Firms listed in the TSE

Cheng-Hwai Liou, Associate Professor, National Taichung Institute of Technology, Department of Accounting, Taichung, Taiwan, jhliou@ntit.edu.tw

We integrate accounting information and corporate governance variables in the business valuation model to understand the value relevance of ownership structure and other corporate governance factors. Based on the Ohlson equity valuation model, we examine the firms listed in the Taiwan Stock Exchange to understand the influence of corporate governance on firm value.

■ WC09

S-Ming I

Vehicle Routing Problem I

Contributed Session

Chair: Chih-Ping Chiang, Professor, Department of Industrial Engineering and Management, Cheng Shiu University, 840 Chengcing Road, Niasong, Kaohsiung County, 83347, Taiwan, chiangcp@csu.edu.tw

1 - A Network Model for the Multiple Depot Vehicle Scheduling Problem of Inter-city Bus Carriers

Jin-Yuan Wang, Associate Professor, National Chiao Tung University, Dept. of Transportation, National Chiao Tung University, Hsinchu, 30010, Taiwan, jinyuan@mail.nctu.edu.tw, Chin-Kang Lin

This paper presents a network model for multiple depot vehicle scheduling problems. Many practical characteristics are considered such as idle time, vehicle numbers, service continuity, and deadhead trips. This paper also proposes a solution procedure combining the modified branch-and-bound and divide-and-conquer method to solve this problem efficiently. The testing results indicate that the proposed MDVSP model and the solution procedure are useful for practical operations.

2 - Urban Distribution: A Time-dependent Vehicle Routing Problem

Chunhua Tian, IBM China Research Lab, Building 19 Zhongguancun Software Park, 8 Dongbeiwang West Road, Haidian Distric, Beijing, BJ, China, chtian@cn.ibm.com, Ding Wei, Rongzeng Cao

Urban distribution is a time-dependent vehicle routing problem (TDVRP) since there is great variance in urban traffic within a day. There is no efficient algorithm for general TDVRP. Considering the rhythm in urban traffic, a simplified TDVRP model is proposed. A two-phase heuristic algorithm, consisting of sweeps algorithm for vertexes clustering and 2-Opt algorithm with a new strategy, is presented to reduce computational complexity within polynomial scale.

3 - A Study on the Dynamic Vehicle Routing Problem for the Mix Loaded Fleets

Kazuho Yoshimoto, Professor, Waseda University, 3-4-1 Okubo Shinjuku-ku, Shinjuku-ku, 169-8555, Japan, kazuho@waseda.jp, Takako Sorimachi, Akira Amiya, Yuichiro Watanabe

This paper presents the algorithm for the D-VRP for the motorbike messengers picking up and dropping off their loads continuously. To reduce the time for picking up a new demand, proper position to stay after one delivery, that is "home-position" and best route planning are required. Applying the conceptions of "scalar potential" which represents probability of new demands and "pattern coefficient" to keep the scattering degree of messengers, costless and quick-response service is achieved.

4 - An International Intermodal Routing Problem

Tsung-Sheng Chang, Assistant Professor, National Dong Hwa University, 1, sec.2, Da-Hsueh Rd., Shou-Feng, Hualien, Taiwan, ts@mail.ndhu.edu.tw

This study focuses on an international intermodal routing problem. The problem is formulated as a multiobjective multimodal multicommodity flow problem with time windows and concave costs. The objective of this paper is then to propose an algorithm that can effectively solve the problem. The problem is NP-hard. It follows that the proposed algorithm is a heuristic.

5 - The Vehicle Routing Problem in a Lumpy Demand Environment

Chih-Ping Chiang, Professor, Department of Industrial Engineering and Management, Cheng Shiu University, 840 Chengcing Road, Niasong, Kaohsiung County, 83347, Taiwan, chiangcp@csu.edu.tw

The objectives addressed in this paper are route planning efficiency and capacity requirements. A genetic algorithm augmented with optimal search scheme for the vehicle routing problem is presented. In lumpy demand situation, the required vehicle capacity is affected by demand variability and the correlation between customer demands assigned to the routes. Computational experiments are performed and the significance of considering lumpy demand in the vehicle routing planning is also discussed.

■ WC10

S-Ming II

Optimization Theory

Contributed Session

Chair: Rui Ge, Huazhong University of Science & Technology, Wu Han, Wu Han, China, happygerui@126.com

1 - Design of Multirate Analog IIR SC Filter Using Convex Programming with Equality Constraints

Ngai Cheong, Associate Professor, Macau Polytechnic Institute, Macau, Rua de Lu Gonzaga Gomes, Macau, Macau, China, ncheong@ipm.edu.mo

This paper describes a novel approach to implement a multirate analog SC filters using convex programming with equality constraints. This procedure optimally distributes a limited capacitance area in the input branches of individual IIR SC filter, by minimizing the overall capacitor spread while simultaneously to achieve minimum total capacitor area. Compared to the previous design example, the redesign shows that at least 10% reduction of total capacitance area.

2 - A Globally Convergent Parallel Genetic Algorithm for a Class of Bilevel Nonlinear Programming

Guang-min Wang, University, Systems Engineering Institute, Wuhan, China, wgm97@163.com, Xianjia Wang, Zhongping Wan

We propose a globally convergent parallel genetic algorithm for solving a special class of bilevel problem. By applying Kuhn-Tucker condition, the original problem is transformed into a single level programming, which can be turned into a series of nonlinear programming without constraint. So we can get the original solution by solving finite nonlinear programming using genetic algorithm in parallel. Finally, a illustrative example verifies the feasibility and efficiency of the proposed algorithm.

3 - Optimization Problems with Structure

Pawel Radzikowski, Murex, 22E 29St, New York, United States, pawelr@aol.com

Mixed Optimization with Structure (MOS) combines optimization and Constraint Propagation. Even though such a hybrid approach is equivalent to a mixed integer optimization, MOS offers a more flexible modeling framework than Mathematical Programming (MP) alone. It contributes logic-based methods such as domain reduction and constraint propagation to accelerate the search. Together they exploit problem structure to more effectively direct the search for solutions.

4 - Probabilistic Optimum Design of Composite Structures

Rui Ge, Huazhong University of Science & Technology, Wu Han, Wu Han, China, happygerui@126.com

The conventional optimistic algorithm may face the difficulty of function derivation or un-derivation for the complex construction in the practical problems. And the imperfection of new intelligent optimistic algorithms usually brings on the divergence of the objective function or the low computational efficiency. Because of these, we improved the particle swarm optimization, and successfully used it in the probabilistic optimum design of composite structures.

■ WC12

S-Celestial Court-Jade

Information Security

Contributed Session

Chair: Vu Tran, Senior Director of Engineering, NDS, 3500 Hyland Avenue, Costa Mesa, CA, 92626, United States, vtran@nds.com

Co-Chair: Hugo Latapie, Vice President of Engineering, NDS, 3500 Hyland Avenue, Costa Mesa, CA, 92626, United States, hlatapie@ndsamericas.com

1 - A Practical Technique for Protecting High-Value Data in Remote Part Manufacturing Factories

Vu Tran, Senior Director of Engineering, NDS, 3500 Hyland Avenue, Costa Mesa, CA, 92626, United States, vtran@nds.com, Hugo Latapie

Production of parts for high-value market often requires the use of personalized part data. Protecting these intellectual property requires a combination of data obfuscation, conditional access enforcement, and distribution policy. We present a practical solution to protecting personalized data deployed in overseas production factories. Our solution has been widely used by large corporations at largest semiconductor production facilities worldwide.

2 - Practical Realization of Quantum Networks

Muhammad Mubashir Khan, Assistant Professor, NED University of Engg & Tech Karachi, University Road Karachi, Karachi, Si, 75270, Pakistan, m_mubashir_khan@hotmail.com, Najeed Ahmed Khan

In this paper we have presented a quantum network design which can be implemented for the realization of large scale Quantum Key Distribution (QKD) networks. Several issues pertaining to the security of such networks have also been discussed. Furthermore, several new ideas are presented and discussed to integrate the QKD technique in the classical communication networks.

3 - Extensible MMFI4Onto for Resource Management in Semantic Web Service

Chong Wang, Student, Wuhan, Wuhan, China, wangchongwhu@163.com

Ontology is the key issue to annotate semantics and provide communicational foundation for various resources on web. The main contribution of this paper is to propose MMFI4Onto as a common facility to register ontology and promote interoperability between them. Further extension based on MMFI4Onto enables registration of process ontology for web services in semantic web. Extensible MMFI4Onto can coordinate with other registry mechanisms and fulfill management of resources in semantic web service.

4 - An Integral Solution for Securing Production of High-Value Parts in 3rd-Party Manufacturing Factorie

Hugo Latapie, Vice President of Engineering, NDS, 3500 Hyland Avenue, Costa Mesa, CA, 92626, United States, hlatapie@ndsamericas.com, Vu Tran

Traditional production infrastructure requires part owners to rely completely on part manufacturers to protect the production process overseas. Our solution allows 1) clearly separate areas of operation controlled by each party, 2) an architecture that allows maximum production flexibility for manufacturers, and 3) an infrastructure to support secured remote monitoring for the part owners. This solution has been adopted at several largest semiconductor facilities worldwide.

WC13

S-Celestial Court-Pearl

Optimal Inventory Policy

Contributed Session

Chair: Shoshana Anily, Professor, Tel Aviv University, Faculty of Management, Tel Aviv, Israel, anily@post.tau.ac.il

1 - On Cycle Demand Inventory Models with Quantity Discount Policy

Ruo-Yiao Ni, Natioal Taipei University of Technology, No 1, Sec 3, Chung-Hsiao E.Rd., Taipei, Taiwan, s448801@ntut.edu.tw, Jung-Fa Tsai

This study considers an optimal inventory model for the items of cycle demand and with quantity discount considerations. First, the future demands are estimated by using time series analysis. Then we formulate an inventory model with quantity discount functions according to the estimated demands. For finding the optimal solution of the inventory model, convexification strategies and piecewise linearization techniques are applied to transform the inventory model into a convex programming problem.

2 - The Single Vendor, Single Supplier Inventory Models

Suresh Goyal, Professor, John Molson School of Business, Concordia University, 1455, DeMaisonneuve Blvd. West, Montreal, PQ, H9B2S3, Canada, sgoyal@jmsb.concordia.ca

The problem of determining the economic operating policy for an inventory item that is procured from a single supplier by a vendor has attracted the attention of numerous researchers during the last 25 years. In this paper, we propose to present some of the recently developed mathematical models for this interesting and practical inventory problem.

3 - An EOQ Model with Multiple Replenishment Batches in One Order

Juhwen Hwang, Associate Professor, National Dong Hwa University, No. 1, Sec. 2 Da Hsueh Rd., Shoufeng, Hualien, TN, 97401, Taiwan, hjw@mail.ndhu.edu.tw

This paper discusses optimal policies for an EOQ system with limitations in ordering capacity. The limitation will be considered as the capacity of an ordering batch. Based on the batch capacity, a choice of multiple batches in an order is allowed with an appropriate increase in the original cost of setup. The optimal number of batches in an order has shown to be a single critical number policy for either fixed or uncertain capacity of a batch.

4 - Integrated Inventory and Transportation Control of a Multi-product Two-echelon Logistics System

Zhao Qihong, Associate Professor, Beihang University, School of Economics and Management, Bei Jing, 100083, China, qzhzhao@buaa.edu.cn, Yu Yue

The paper presents a model for integrated inventory and transportation control of a logistics system: the supplier is responsible for delivering multi-products to retailers, whose demands follow Poisson distribution. The problem is considered as Markov decision process and aims at finding the optimal replenishment policy. An algorithm based on Modified Policy Iteration is designed, which can find the nearly optimal solution within reasonable time when the multi-product attribute is considered.

5 - The Retailer's Optimal Pricing and Replenishment Policy in a Market with Discretionary Customers

Shoshana Anily, Professor, Tel Aviv University, Faculty of Management, Tel Aviv, Israel, anily@post.tau.ac.il, Refael Hassin

We consider a pricing and replenishment model in which the retailer advertises the selling periods of the product. Customers, who differ in their reservation price and the time they need the product, are assumed to be discretionary, i.e., if at that time the product is not available they may buy it earlier or later paying a holding or shortage cost, respectively, or they may quit. We analyze the retailer's optimal policy for general and uniform distributions of the customers reservation price.

WC14

S-Celestial Court-Coral

Special Invited Session on Patient Safety

Cluster: Health Applications - Joint Invited/Sponsored

Chair: Augustine Esogbue, Professor & Director, ISCL, School of Industrial and Systems Engineering, Georgia Institute of Technology, Atlanta, GA, 30332-0205, United States, aesogbue@isye.gatech.edu

1 - A Study of the Impact of Aviation Safety Reporting System on Patient Safety Models at VA Hospitals

Vaibhav Shah, Intelligent Systems & Controls Lab, 333898 Georgia Tech Station, Atlanta, GA, 30332, United States, vshah@gatech.edu, Augustine Esogbue, Akshay Kotak

Medical error, the 8th largest cause of preventable patient death in the US, is a topic of considerable interest in modern healthcare delivery systems especially those emphasizing patient safety. In this paper, we report the use of NASA's confidential, voluntary and non-punitive Aviation Safety Reporting System (ASRS) to impact patient safety models and delivery systems at the VA. The implication for other technology-based approaches is also addressed.

2 - Development of a Patient Safety Culture Measurement Tool for Ambulatory Care Settings

Michael A. Counte, Professor, Saint Louis University, Department of Health Management & Policy, 377 Salus Center, 3545 Lafayette Avenue, St. Louis, MO, 63104-1314, United States, countem@slu.edu, Amanda Schutz

Although patient safety research has identified the development of patient safety culture as a necessary precursor to patient safety improvement, existing tools for assessing patient safety culture are too long for practical implementation. A new, abbreviated survey for patient safety culture was developed for ambulatory care and outpatient clinics. We report the result of our study with respect to content validity. The utility of this measure of patient safety culture was demonstrated.

3 - Space Technology Aids to Patient Safety

Augustine Esogbue, Professor & Director, ISCL, School of Industrial and Systems Engineering, Georgia Institute of Technology, Atlanta, GA, 30332-0205, United States, aesogbue@isye.gatech.edu

Patient safety is a current and compelling concern in health care due to the enormity and pervasiveness of the problem. The injection of various technologies, hard and soft, is considered instructive. Systems technologies including information processing modules and human systems anchored tools have begun to be embraced. We report some of these efforts particularly space technology spinoffs with impressive impacts on the problem.

■ WC15

S-Celestial Court-Amber

Theory and Application of Analytic Hierarchy

Contributed Session

Chair: Changrui Yu, Improvement of the Analytic Hierarchy Process Method, Shanghai Jiaotong University, Management School, Shanghai Jiaotong Uni, Shanghai, 200052, China, yucr@sju.edu.cn

1 - An Evaluation Method of ERP Implementation Based on Analytic Network Process

Jinyu Wei, Associate Professor, Tianjin University of Technology, No. 263 Hongqi Nan Road, Nankai District, Tianjin, 300191, China, weijinyu@eyou.com

This paper presents an evaluation method of ERP Implementation with the Analytic network process. ERP implementation is the critical factor when ERP system is estimated and selected for an enterprise. Although ERP system is put into operation based on the basic thought of management, different system is suitable for different enterprise. The objective character of criterion factor in ANP feedback approach demonstrate the advantage of ERP and both its evaluation method.

2 - AHP Based Evaluation Methodology of Enterprise Informatization Engineering

Jie Zhang, Professor, Research Institute, Shanghai Jiao Tong University, F12, Haoran Building, 1954 Hua Shan Road, Shanghai, 200030, China, zhangjie@sju.edu.cn

Abstract not available at this time

3 - Comparing Fuzzy Preference Relations and AHP as for the Decision Making in Project Management

Wang Tien-Chin, Professor, Department of Information Management, I-Shou University, 1, Section 1, Hsueh-Cheng Road, Ta-Hsu, Kaohsiung, 840, Taiwan, tcwang@isu.edu.tw, Chen Ying-Hsiu

This work applies the fuzzy preference relation (Fuzzy PreRa) to solve the problems of (Al-Harbi, 2001). The analyzed prediction outcome obtained by Fuzzy PreRa almost coincides with that produced by the AHP method. Notably, the ratio of the pairwise comparison times of the priority weight for the six influential factors between Fuzzy PreRa and AHP is 5:15, because Fuzzy PreRa uses simple reciprocal additive transitivity from a set of preference data.

4 - Application of MADM in R&D Management

Navid Asgari, MBA Student, Multimedia University, MBA Centre-Multimedia University, Jalan Multimedia, Cyberjaya, Se, 63100, Malaysia, navidas20@yahoo.com, Avvari Mohan

In this paper we try to illustrate the role of AHP as a tool in R&D management. At first we review the importance of research and development in today's industries which are playing in an ever-evolving and challenging market. Then our agenda will be an insight into MADM as a decision making tool. Managers in all fields deal with a lot of alternatives in R%D management units. Significance of this article is that it provides an insight into use of decision-making tools in technology management issues.

5 - Improvement of the Analytic Hierarchy Process Method

Changrui Yu, Improvement of the Analytic Hierarchy Process Method, Shanghai Jiaotong University, Management School, Shanghai Jiaotong Uni, Shanghai, 200052, China, yucr@sju.edu.cn

In this paper, supposing that the decision-maker is rational, we offer a new valid and reasonable AHP decision method, to deal with the situation where the decision-maker is not consistent enough, and we do not change his mind. The method doesn't require the consistency test, includes all the judgments preferences of the decision-maker, is easier to deal with and the decision process can be carried out successfully in some case.

■ WC16

S-Celestial Court Amethyst

Logistics Network Design

Contributed Session

Chair: Jih-Biing Sheu, National Chiao Tung University, 4F, 114 Chung Hsiao W. Rd., Sec. 1, TP, Taipei, 10012, Taiwan, jbsheu@mail.nctu.edu.tw

1 - The Chance Constrained p-Center Problem on a Network with Discrete Probabilistic Demand Weights

Jiamin Wang, Assistant Professor, Long Island University, 720 Northern Boulevard, Brookville, NY, 11548, United States, jiamin.wang@liu.edu

The p-center problem is one of the classical network facility location problems. In this study we extend the p-center problem by considering that the demand originating from the nodes of a network is probabilistic. It is assumed that demand weights are independent discrete random variables. A chance constrained program is introduced to define beta-reliable centers of the network. The properties of these centers are identified and exact solution procedures are developed for solving the problem.

2 - A Study of Location Problem and Vehicle Routing Problem for the Obnoxious Facility

Chikong Huang, Professor, Dept. of Industrial Management, National Yunlin University of Science & Technology, 123 University Road, Section 3, Touliu, 640, Taiwan, huangck@yuntech.edu.tw, Yung-Yu Wu

This research focuses on locating feasible area for the obnoxious facility, identifying the suitable site within the feasible area, and assigning vehicle servicing routes. A three-stage heuristic algorithm is proposed. First, the area for all feasible sites is screened. The second stage is searching location for obnoxious facility using GA. The third stage solves vehicle routes using the TA. The algorithm has been successfully tested by well-known examples.

3 - Improving the Landside Operation of a Container Terminal with an Intermediate Storage Area

Thorsten Koch, Zuse Institute Berlin, Takustr. 7, Berlin, 14195, Germany, koch@zib.de, Gary Froyland, Nicole Megow, Howard Wren

To increase the efficiency of their landside operation, Patrick Coperation in Sydney currently builds an automated Intermediate Storage Area (ISA) into there Botany Bay container terminal. We present a two phase algorithm to manage the ISA, including control of the RMGs, selecting storage positions for the containers, and assigning truck and straddle carrier slots. Simulated results on real world data will be presented.

4 - A Novel Planning Methodology for Hierarchical Global Logistics Networks Configurations

Jih-Biing Sheu, National Chiao Tung University, 4F, 114 Chung Hsiao W. Rd., Sec. 1, TP, Taipei, 0, 10012, Taiwan, jbsheu@mail.nctu.edu.tw, Yung-Hsiang Lin

We present a novel global logistics networks model in which the network components such as hubs and depots are hierarchically characterized. The method is integrated integer programming and cluster analysis to determine the locations, numbers and the scope of service areas of facilities with the goal of minimizing the network configuration cost. The numerical results indicate the potential advantages of the proposed model. We hope that this study can improve the decision efficiency.

■ WC17

H-Crystal Room 1

Pricing and Inventory Decisions in Supply Chain Management

Cluster: Special Sessions

Invited Session

Chair: Jian Chen, School of Economics and Management, Tsinghua University, Beijing, 100084, China, chenj@em.tsinghua.edu.cn

1 - Fresh Product Supply Chain Coordination under CIF Mechanism with a Third-Party Logistics Provider and Uncertain Transportations

Jian Chen, School of Economics and Management, Tsinghua University, Beijing, 100084, China, jchen@tsinghua.edu.cn, Y. B. Xiao, X. L. Xu, Xiaoqiang Cai

This paper focuses on the coordination of three parties involved in a fresh product supply chain under the CIF business model with a Third-Party Logistics Provider (3PLP) and uncertain transportations. A manufacturer produces a kind of fresh product and transports them to a distant wholesale market for sale by a 3PLP. The 3PLP decides on its unit transportation fee, considering the impact on the manufacturer's transportation quantity, with the objective to maximize its own profit. Because of the uncertain transportations, the manufacture faces the risk that the product may decay or deteriorate before it arrives at the distant market. The initial production quantity decision needs to be made before the transportation occurs, and the wholesale price has to be determined when the product arrives at the wholesale market, basing on the freshness level of the product. The consumer-market risk is borne by the downstream wholesaler, who decides on the purchasing quantity and the retailing price. The optimal decisions faced by the 3PLP, the manufacturer and the wholesaler are studied separately under the decentralized and centralized situations. An incentive scheme which comprises of two parts is developed to make the decentralized supply chain coordinated.

2 - The Supplier and Retailers' Optimal Strategies in a Supply Chain under a Group-Buying Pricing Mechanism

Yunhui Liu, School of Economics & Management, Tsinghua University, Beijing, 100084, China, liuyh3@em.tsinghua.edu.cn, Jian Chen, Xiaoqiang Cai, X.P. Song

We concern about a supply chain with one supplier and k retailers, where the supplier offers a new pricing mechanism based on the group-buying scheme, while the retailers attempt to exploit the pricing mechanism so as to optimize their respective objectives. We investigate the optimal order strategy for retailers and the optimal pricing strategy for the supplier. Then, we consider the efficiency of the GBP mechanism and demonstrate that it is a win-win strategy for all the traders in the supply chain compared to the post price mechanism.

WC19

H-Crystal Room 3

Business Processing Management

Cluster: Web-Service Related Technology
Invited Session

Chair: Frank Tong, E-Business Technology Institute, The University of Hong Kong, Pokfulam Road, Hong Kong, Hong Kong, ftong@eti.hku.hk

Co-Chair: Joshua Huang, PhD, Assistant Director, E-Business Technology Institute, The University of Hong Kong, Pokfulam Road, Hong Kong, HK, China, jhuang@eti.hku.hk

1 - Service-oriented Distributed Model-based Data Mining

William Cheung, Associate Professor, Hong Kong Baptist University, Department of Computer Science, Hong Kong, william@comp.hkbu.edu.hk

We will describe a learning-from-abstraction distributed data mining paradigm and report the performance of a service-oriented implementation which adopts BPEL to specify the distributed mining process for execution

2 - SOA Analysis for Technology Adoption in SCM/Logistics

Zongwei Luo, ETI, HKU, Hong Kong, HK, China, zwluo@eti.hku.hk

In this contribution, we will outline an SOA oriented analysis for technology adoption in SCM and e-logistics. A case study on RFID technology adoption in SCM and e-logistics related organization will be reported based on this SOA analysis framework.

3 - Scheduling Client Requests in Active Caching

Benjamin Yen, Associate Professor, The University of Hong Kong, School of Business, Pokfulam Road, Hong Kong, 00000, Hong Kong, benyen@business.hku.hk, May Wang

This study aims to improve personalized content caching performance by caching requests using scheduling methods. Active caching enables customization by providing cached objects and associated cache applets. Models are provided in this study to map different content request scenarios into scheduling problems. Simulations are followed to investigate the applicability and complexity of each model.

4 - Webservice-oriented Analytical Target Cascading System for Optimal Supply Chain Configuration

George Q Huang, gqhuang@hku.hk, Ting Qu

This paper considers the optimal configuration of a class of supply chains with hierarchical, either convergent or divergent, structure. The optimization method used is based on Analytical Target Cascading (ATC). The optimization systems for constituent enterprises are deployed as webservices. They are then coordinated through an ATC engine to obtain the overall optimum solution.

WC20

H-Jade Suite 1

Heuristic Approaches

Contributed Session

Chair: Tai-Hsi Wu, Professor, Department of Industrial Engineering and Technology Management, 112, Shan-Jiau Rd., Da-Tsuen, Changhua, 515, Taiwan, taiwu@mail.dyu.edu.tw

1 - Directed Evolution Strategy: Towards an Improved Performance of Evolution Strategies

Abdel-Rahman Hedar, Kyoto University, Dept. of Applied Mathematics and Physics, Kyoto University, Kyoto, 606-8501, Japan, hedar@amp.i.kyoto-u.ac.jp, Masao Fukushima

Evolution Strategies (ESs) are a main class of Evolutionary Algorithms. Although several works have been proposed, ESs are still very expensive. In this work, we present Directed Evolution Strategy (DES) to overcome some drawbacks of ESs. The mutation is modified to use parents' experience to direct the offspring and

the recombination is modified to reproduce offspring in a promising area slightly away from their parents. DES shows much cheaper performance than other ESs.

2 - A Scatter Search Approach For The Dial-a-Ride Problem

Edna Chan, Lecturer, Singapore Polytechnic, Department of Mathematics & Science, 500 Dover Road, Singapore, 139651, Singapore, EdnaChan@sp.edu.sg, John Baugh

The Dial-a-Ride Problem (DARP), an NP-hard problem, is a mathematical model that closely approximates the problem faced by transit agencies. In this paper, we will be considering a many-to-many, advanced-request, multi-vehicle static DARP. The formulation of this problem, e.g. policies and multi-objectives, is derived from a study conducted with the Winston Salem Transit Authority (WSTA), USA. A Scatter Search approach was adopted and results obtained from the WSTA data will be presented.

3 - A MAX-MIN Ant System for Unconstrained Multi-Level Lot Sizing Problems

Christian Almeder, assistant professor, University of Vienna / Department of Business Studies, Bruenner Strasse 72, Vienna, 1210, Austria, christian.almeder@univie.ac.at, Karl Doerner, Richard F. Hartl, Rapeepan Pitakaso

We present an ant based algorithm for solving unconstrained multi-level lot-sizing problems called ant system for multi-level lot-sizing algorithm (ASMLLS). We apply a hybrid approach where we use the ant system to optimize the lot sizing sequence and a Wagner-Whitin algorithm for lot sizing. Based on the modified sequence dependent time-varying setup costs each ant generates a sequence of items to be lot sized. Then a simple single stage lot sizing rule is applied to calculate the lot sizes.

4 - Solution Approach for the Cell Formation Problem

Tai-Hsi Wu, Professor, Department of Industrial Engineering and Technology Management, 112, Shan-Jiau Rd., Da-Tsuen, Changhua, 515, Taiwan, taiwu@mail.dyu.edu.tw, Kevin H.-M. Meng

The cell formation problem determines the decomposition of the manufacturing cells of production system in which machines are assigned to these cells to process one or more part families so that each cell is operated independently and the intercellular flows are minimized or the number of parts flow processed within cells is maximized. In this paper, a simulated annealing algorithm is presented to solve the problem. Test problems are used to evaluate the performance of the proposed algorithm.

WC21

H-Jade Suite 2

Marketing Business Application

Contributed Session

Chair: Raymond G. Sin, Hong Kong University of Science and Technology, Information and Systems Management, HKUST, Clear Water Bay, Kowloon, Hong Kong, rsin@ust.hk

1 - Cultural Measurement Invariance of a Workplace Ethics Scale

Paul Sauer, Professor, Canisius College, 2001 Main St., Buffalo, NY, 14208-1098, United States, sauer@canisius.edu, Paul Chao

A five-item scale designed to measure ethical beliefs regarding acceptance of gifts from suppliers is tested for cultural measurement invariance across four different Chinese locations: Beijing, Hong Kong, Taiwan, and Guangzhou. Results show that items measuring ethical beliefs with regard to acceptance of gifts from suppliers exhibits full metric and factor variance invariance as well as partial scalar invariance. Implications for scale applicability are discussed.

2 - Fencing in the Context of Revenue Management

Michael Zhang, Assistant Professor, Saint Mary's University, 903 Robie Street, Halifax, NS, B3H 3C3, Canada, mzhang@ivey.uwo.ca

Market segmentation is a key strategic element in the practice of revenue management (RM). After being identified, market segments should be kept separate to prevent demand spillover from high priced segments to low priced segments. Tools to restrict customer migration across segments are referred as "fences". The purpose of this study is to explore pertinent business issues surrounding fences in the practice of RM. Optimal fences are characterized.

3 - Everyday, Low Prices? An Investigation of the Practice of EDLP in Electronic Markets

Raymond G. Sin, Hong Kong University of Science and Technology, Information and Systems Management, HKUST, Clear Water Bay, Kowloon, Hong Kong, rsin@ust.hk, Ramnath K. Chellappa, S. Siddarth

Using a hierarchical modeling approach and 1,137,500 unique price observations on the Internet, we investigate specific dimensions along which EDLP is adopted in the low search cost environment of electronic markets. Our findings offer the first formal evidence of category-specific adoption of price format that has been widely speculated in existing literature.

Wednesday, 1:30pm - 3:00pm

■ WD01

S-Tang II

Quality Management in Different Sectors

Contributed Session

Chair: Thanakorn Kiatbanlue, Associate Professor, King Mongkut's Institute of Technology North Bangkok, 1518 Piboonsongkram Rd., Bangsue, Bangkok, 10800, Thailand, kiatbanlue@yahoo.com

1 - Analysis of the Relationship Between Organizational Commitment and Social Accountability

Deniz Kucukusta, MBA, Dokuz Eylul University, Center for Quality and Excellence, Turkey, deniz.kucukusta@deu.edu.tr, Birgul Cakir, Kamil Yagci, Ozkan Tutuncu

Social Accountability (SA) is accepted as the most comprehensive international ethical workplace management system available. Organizational commitment (OC) has impacts on organization's service and individual's life quality. Study aims to determine the relationship between OC and SA. OC and SA 8000 Questionnaire are applied to Turkish SA certified firms' employees. Results show that the relationship between organizational commitment and Social Accountability System was significant.

2 - Analyzing the Customer Responses in Process Optimization - A Case Study on Rubber and Tire Industry

Mahdi Bashiri, PhD student, Tarbiat Modares University, Industrial Eng. Dep., Faculty of Engineering, TMU, Tehran, Iran, bashiri@modares.ac.ir, Reza Kazemzadeh

In Process Optimization, experimenter always knows about producer requirements (such as standards) and customer needs are not attending at the same stage. Analyzing of Producer responses and Customer responses simultaneously can reduce such delay, so customer needs can be another response. This paper presents a new approach to formulate multiple responses and customer voice and also solving the correlated responses. The proposed procedure was done in the Tire and Rubber industry in Iran.

3 - The Employee Satisfaction of Turkish Public Sector in the Framework of EFQM Model

Baris Carikci, Reseacher, Tusside, Barýp, Mah, Ko, uyolu Cad, No: 48, Kocaeli, 41, Turkey, bcarikci@yahoo.com

The interests of public institutions on quality management (QM) have been increasing in Turkey for the last decade. However, public management is lacking of a clear and causal model which leads efficient result of these efforts. This presentation is explaining a model for employee satisfaction, one of the most important result of the QM, in public according to the framework EFQM. The aim is to present and to find the enablers of EFQM model that mostly affect the employee satisfaction.

4 - The Benefits and Drawbacks of ISO 9001 Implementation in Thailand

Thanakorn Kiatbanlue, Associate Professor, King Mongkut's Institute of Technology North Bangkok, 1518 Piboonsongkram Rd., Bangsue, Bangkok, 10800, Thailand, kiatbanlue@yahoo.com

This research studies benefits and drawbacks to organizations after certified ISO 9001. From questionnaires of 160 companies show many benefits: making good image, better management and good document system. For the drawbacks, there are increasing in documents, working steps and expenses. Besides, this research found that the ISO 9001 made a good investment in Thailand.

■ WD02

S-Tang I

Knowledge Work and Organization

Cluster: Knowledge-Based Resource Management
Invited Session

Chair: A. D. Amar, Professor (Strategy & Policy) & Director of MBA Assessment, The Stillman School of Business, Seton Hall University, 650 Kozlowski Hall, South Orange, NJ, 07079, United States, amaramar@shu.edu

1 - Extracting a Knowledge Map from a Collection of Bill Gates Speeches

Yi-Jen Yeh, PhD student, Institute of Information Management, Chiao Tung University, 1001 Ta Hsueh Road, Hsinchu, 300, Taiwan, yjyeh.iim87g@nctu.edu.tw, Soushan Wu, Jing-Jang Hwang

In this study, we extract a knowledge map from a collection of Bill Gates' speeches. We applied techniques of text mining and Growing Hierarchical Self-organizing Map to deduce the knowledge map. The map sorts out some

dominant managerial logics inside Gates' thoughts. We further applied the Social Cognitive Theory to analyze the knowledge disclosed from the map to understand how Bill Gates has shared his thoughts with the social populace and influenced their behaviors.

2 - Innovation Strategies for Maturing Knowledge Organizations

A. D. Amar, Professor (Strategy & Policy) & Director of MBA Assessment, The Stillman School of Business, Seton Hall University, 650 Kozlowski Hall, South Orange, NJ, 07079, United States, amaramar@shu.edu

As knowledge organizations succeed, they evolve themselves into the "operating" ones, losing their *raison d'être*, the innovation. With results from an empirical study, this work models their life cycle and characteristics and behavior through its various stages. It provides strategies to revitalize innovation in those maturing and declining.

■ WD03

S-Ballroom A

Queueing

Contributed Session

Chair: Zhengwen He, Assistant Professor, Xi'an Jiaotong University, Shaanxi, Xi'an 710049, China, Xi'an, China, zhengwenhe@xjtu.edu.cn

1 - Spatial Performance Analysis Model in Wireless Networks

Mingxin Liu, Yanshan university, 438 Hebei Avenue, Qinhuangdao, HB, 066004, China, cliu@ysu.edu.cn, Naishuo Tian

By introduced spatial queues theory, a SPHAP/M/c/c loss system is brought forward to model the admit process of traffic form different service area, using spatial phase type arrival process describe the spatial structure of the traffic from different sectors in the same zone. We get the exact spatial performance measure of the as channel utilization ratio of the system and the sectors, blocking probability of the system and the sectors.

2 - The Discrete Time Geom/Geom/1 Queue with Working Vacations

Naishuo Tian, College of Sciences, Yanshan University, Yanshan University, Qinhuangdao, He, China, mzhy55@163.com, Zhanyou Ma

In this paper, we study a discrete time Geom/Geom/1 queue with multiple working vacations. Using quasi birth and death chain and matrix-geometric solution method, we give distributions for the number of customers in system and the waiting time of a customer and their stochastic decomposition structures, obtain distributions of the additional number of customers and additional delay. Furthermore, we derive the formulae of expected regular busy period and expected busy cycle.

3 - Some Results on the M/M/1 Queue with Working Vacations

Xiu-li Xu, Yanshan University, College of Sciences, Yanshan University, Hebei Qinhuangdao, China, xli-ysu@163.com, Naishuo Tian

Using quasi birth and death process and matrix-geometric solution method, we give concise expressions of distributions for queue length and waiting time in an M/M/1/WV queue which have intuitionistic probability sense. Furthermore, we indicate stochastic decomposition structures and obtain the distributions of additional queue length and additional delay. Finally, we get the computing formulae of expected regular busy period and expected busy cycle.

4 - Designing a Better-Arranged Toll Plaza

Shouting Shang, Harbin Institute of Technology, Box 1238 Dept. Math, sst@hit.edu.cn, Xiaofeng Lu, Ziyang Liu, Yisu Xu

This paper discusses mainly how to find out the optimal number of tollbooths for a toll plaza. "Optimal" is considered as a good balance between the benefit of the highway proprietors and that of the drivers of the vehicles. A Total Cost Function is thus brought forward to estimate the whole performance of the system, which is the sum of the cost of constructing and operating the tollbooths and that of the vehicles waiting in the queues, each with a weight factor. Our object, therefore, is to find out the number of tollbooths that minimizes the value of the Total Cost Function. We applied two different approaches to the problem. The first is an easy method to estimate the optimal tollbooth number, and the other, which we mainly focus on, is based on the stochastic queueing theory, a theory that is quite appropriate to describe this problem, and is proved to be effective and accurate. From the model constructed based on this theory, a good algorithm to achieve the object is put forward, and applied to a concrete instance to get a satisfying result. We compared the optimal design by calculation with the one that there's exactly one tollbooth per incoming lane, which suggests that the optimal one does have remarkable predominance in many aspects, especially when traffic is heavy. Moreover, we developed a simulation program with C++, which simulates a toll plaza with several tollbooths and vehicles coming to pay tolls. The outcome of the program is roughly consistent with that of the theoretical computed results, which gives the confirmation that our approach is effective enough to use in practice. At last, stability analysis is made to prove that our model will be well robust under small perturbations of its underlying parameters. As an extension of this problem, some more methods to optimize a toll collecting

system other than choosing the best tollbooth numbers, are also discussed in the paper, including applying different payment modes, dynamic controlling of the tollbooths, etc. Besides, since traffic congestion might also occur at the exit of a toll plaza, we designed an optimal arrangement of traffic lanes that enter or leave a toll plaza, which may ease the traffic congestion at not only the entrance but also the exit of it.

5 - On Multi-mode Project Payment Scheduling

Zhengwen He, PhD, Xian Jiaotong University, Shaanxi, Xi'an, 710049, China, Xi'an, China, zhengwenhe@mail.xjtu.edu.cn, Yu Xu, Tao Jia

In the problem activities can be performed with multiple modes and the task is to determine the amount and timing of progress payments with the objective of maximizing the net present value of the cash flows in the project. The basic models of the problem are constructed from contractor's and client's perspectives respectively and extended as the progress based, the expense based, and the time based models. A two-module simulated annealing heuristic is developed and tested.

■ WD04

S-Ballroom B

Design of Mass Customization

Cluster: Mass Customization in Manufacturing
Invited Session

Chair: Philip Brabazon, Research Fellow, Nottingham University, Nottingham Uni Business School, Jubilee Campus, Nottingham, NG8 1BB, United Kingdom, philip.brabazon@nottingham.ac.uk

1 - Collaborative Agent-Based Multi-Paradigm Modelling for Decision Support in Supply Chains

Bela Patkai, Researcher, Tampere University of Technology, P.O.Box 589, Tampere, Finland, bela.patkai@tut.fi

The concept of Complex Adaptive Production Networks suggests that it is useful to consider supply chains as the aggregation of adaptive agents that give rise to emergent system behavior that is hard to predict and control. The agent-based modelling paradigm allows us to use multiple concurrent modelling paradigms in a complex computational model and can be extended and applied in a collaborative modelling environment to support coordinated decision support in supply chains.

2 - Model-based Supply Chain Performance Evaluation

Frank Li, Senior Research Engineer, SIMTech, Choa Chu Kang Street 54, Blk 770, #10-09, Singapore, 680770, Singapore, zpli@SIMTech.a-star.edu.sg, Arun Kumar

This paper postulates a new supply chain performance evaluation methodology by which a supply chain would be evaluated both from structure and operation level. Performance indexes are identified. The paper also clarifies the methodology steps that includes performance index definition, evaluation model establishment, model validation, and result analysis. It suggests that the evaluation methods should be a continuous improvement tool for supply chain innovation.

3 - A Study on the Integration of Lean Production and Six Sigma

Zhen He, Professor, School of Management, Tianjin University, #92, Weijin RD, Nankai District, Tianjin, TJ, 300072, China, zhhe@public.tpt.tj.cn

This paper discusses a combination of two business process improvement approaches, lean manufacturing and six sigma. The necessity and feasibility for their effective combination are addressed. The combining process is presented from the point of management, process approach and quality tool application respectively.

■ WD05

S-Ballroom C

Cutting and Packing II

Cluster: Cutting and Packing
Invited Session

Chair: Hans Kellerer, Dr., University of Graz, Universitätsstrasse 15, Graz, A-8010, Austria, hans.kellerer@uni-graz.at

1 - Bin and Strip Packing Problems with Guillotine Cuts: Improved SHF Heuristic and Exact Algorithm

Abdelghani Bekrar, Student, University of Technology of Troyes (UTT), 12, Rue Marie Curie, Troyes, 10010, France, abdelghani.bekrar@utt.fr, Imed Kacem, Chérif Sadfi, Chengbin Chu

In this paper we consider the problem of packing and cutting in two dimensions with guillotine cuts. We propose some strategies to improve the heuristic SHF proposed by Ben Messaoud et al. (2003). This allowed a reduction in the rate of

waste. For the strip packing problem, we proposed a new lower bound which gives the same results as Martello et al. (2003) but the computation time is much better. We used an adaptation of the branch and bound algorithm proposed by the authors to our problem.

2 - Scheduling Parallel Dedicated Machines with a Speeding-Up Resource

Hans Kellerer, Dr., University of Graz, Universitätsstrasse 15, Graz, A-8010, Austria, hans.kellerer@uni-graz.at, Vitaly Strusevich

We present results for scheduling problems for parallel dedicated machines subject to resource constraints and the objective of minimizing the makespan. It is assumed that a job may consume an additional renewable resource. If a job j is not given the resource, its processing time remains equal to p_j ; otherwise the resource will speed up the processing. Complexity results and approximation algorithms are given.

3 - Optimisation of Raw Material Widths in Practical Cutting Stock Problems

Helmut Schreck, TietoEnator Deutschland GmbH, Bahnhofstrasse 39, Oberhaching, D-82041, Germany, Helmut.Schreck@tietoenator.com

In a typical applied cutting stock problem we cut raw material rolls of large width into a set of order rolls of smaller widths. A reverse problem is to determine the best width of raw material rolls for a set of possible order widths. This reverse problem appears in real production planning applications both as a direct and a subproblem. We show some aspects of its properties and its solution with help of practical case studies from paper and steel industry.

■ WD06

S-Sung I

Applied Stochastic Models

Cluster: Production-Inventory Systems
Invited Session

Chair: Nico Vandaele, Nico.Vandaele@ua.ac.be

1 - Variability in Dynamic Routing Problems

Tom van Woensel, TU Eindhoven, P.O. Box 513, Pav F5, Eindhoven, NL-5600 MB, Netherlands, t.v.woensel@tm.tue.nl, Nico Vandaele, Christophe Lecluyse, Herbert Peremans, Laoucine Kerbache

In routing problems, the variability on travel times can not be ignored in order to carry out a realistic optimization. The approach proposed introduces a travel time distribution based on queueing theory resulting in a stochastic dynamic routing problem. The approach allows for evaluating routes on the travel time risk involved. The models are validated using numerical results based on standard datasets.

2 - A Queueing Model for Throughput and Lead Time Analysis

Nico Vandaele, Nico.Vandaele@ua.ac.be, Nico Goossens

We propose a generic, common database where several queueing models are built upon. We show an open queueing network, a closed queueing network, a deterministic demand analysis and some execution tools based on the outputs of the queueing models. It is an Application System Provided application, fully internet based.

3 - Modeling Supply Chain Flow Variability with the Peakedness

Philippe Chevalier, UCL, chevalier@poms.ucl.ac.be, Jean Francois Macq, Christophe Van den Schrieck

The variability of flows in Supply Chains is typically modeled using renewal processes with IID inter-arrival (or departure) times. A consequence is that the variability will continuously decrease with batch sizes. In many situations this is not observed. There are many explanatory models for this such as : impact of promotions, bullwhip effect, \hat{O} Using the peakedness to characterise the variability of a flow we do not need to assume independent arrivals, we explore here how this type of model can be used to better represent flows within a supply chain.

■ WD08

S-Ching

Queueing Theory

Cluster: Applied Probability - Joint Invited/Sponsored
Invited Session

Chair: Mohan Chaudhry, Professor, Royal Military College of Canada, Dept. of Math and Compt Science, Kingston, On, K7K 7B4, Canada, chaudhry-ml@rmc.ca

1 - A Distributional Little's Law for Discrete-Time Queues with D-MAP Arrivals and Its Applications

Nam Ki Kim, Professor, Chonnam National University, Dept. of Industrial Engineering, 300 Yongbong-dong Buk-gu, Gwangju, 500-757, South Korea, freedom@chonnam.ac.kr, Mohan Chaudhry

For a broad class of discrete-time FIFO queueing systems with D-MAP (discrete-time Markovian arrival process) arrivals, we present a distributional Little's law that relates the distribution of the stationary number of customers in system (queue) to that of the stationary number of slots a customer spends in system (queue). Taking the multi-server D-MAP/D/c queue as an example, we illustrate how to utilize this relation to get the desired distribution of the number of customers.

2 - Geometric and Non-geometric Decays in QBD Processes with Applications in Queueing Systems

Hui Li, Professor, Dalhousie University, Dept. of Industrial Engineering, Halifax, NS, B3J 2X4, Canada, Hui.Li@msvu.ca, Qi-Ming He, Yiqiang Zhao

We study the geometric decays of the steady state distributions of QBD processes with countable background states. We present some sufficient conditions for both the existence and the non-existence of geometric decays of the QBD processes along the level direction and apply the results to a polling system and some other queueing models.

■ WD09

S-Ming I

Project Scheduling

Contributed Session

Chair: Zhongping Wan, Professor, Wuhan University, Wuhan, China, zpwan@public.wh.hb.cn

1 - Cyclic Scheduling of Production and Distribution in a Zero-Inventory Process

Su Gao, PhD, Teaching Assistant, Rutgers University, MSIS Department, 41 Alexander Ave., Kearny, NJ, 07032, United States, speed_gao@yahoo.com, Ronald Armstrong, Lei Lei

We analyze the properties and propose search algorithms for cyclic scheduling of production facility and capacitated delivery trucks in a zero-inventory process. The problem is to minimize the cycle time while subject to the customer demand, product lifespan and production, distribution capacity constraints. We show that the problem is strongly NP-hard and propose a heuristic algorithm for its solutions.

2 - The Worst-case Performance of Priority Algorithms for Scheduling Tasks under Precedence Constraints

Yakov Zinder, University of Technology, Faculty of Science, P.O. Box 123, Broadway, NSW 2007, Sydney, Australia, yakov.zinder@uts.edu.au

The talk is concerned with the problem of scheduling partially ordered unit execution time tasks on parallel identical machines with the criterion of maximum lateness. This problem has been a subject of intensive research over several decades. Since the problem is NP-hard in the strong sense, various polynomial-time algorithms are characterized by their worst-case performance. The talk introduces the notion of a strength, which characterises the worst-case performance of a scheduling algorithm, and proves the existence of a strongest algorithm for a broad class of algorithms.

3 - Ant Colony Optimization for Resource Constrained Project Scheduling with Fuzzy Duration & Cash Flow

Nahid Mobark, Project Manager, Ministry of Housing and Utilities, 42 Esmail Abaza Street, 1 Esmail- Abaza Cairo, 1450, Egypt, n_a_mobark, Mohamed Rasmy

An Ant Colony Optimization proposed to deal with fuzzy mathematics for the resource constrained project scheduling problem with fuzzy time and cash flow (lump sum). The goal is to maximize net present value (npv). We used two ant colonies: one for producing best sequence of activities and other to draw the membership function for (T) and NPV of the best schedule found.

4 - Coordinated Flight Scheduling Models for Cargo Airline Alliances

Chia-Hung Chen, PhD Candidate, Department of Civil Engineering, National Central University, No.300, Jhongda Rd., Jhongli, 32001, Taiwan, s0322092@cc.ncu.edu.tw, Shangyao Yan, Chih-Hwang Tseng

We develop several coordinated scheduling models by combining airport selecting, fleet routing and timetable setting, in order to help the allied airlines solve the most satisfactory cargo fleet routes and timetables when they enter alliances. To evaluate the models, we perform a case study based on real operating data from two Taiwan cargo airlines. The preliminary results are good, showing that the models could be useful for cargo airline alliances.

5 - A Hybrid Intelligent Algorithms for Resource-constrained Project Scheduling

Zhongping Wan, Professor, Wuhan University, Wuhan, China, zpwan@public.wh.hb.cn, Bo Yang

Based on the analysis of the genetic algorithm (GA) and ant colony optimization (ACO) algorithm, a hybrid intelligent algorithm for solving the resource-constrained scheduling is presented. In this method, we solve the initial minimizing project duration by GA firstly, and then update the above obtained

result by the combination of two pheromone evaluation methods by the ants to new good solutions. The proposed method appears to be feasible.

■ WD10

S-Ming I

Semidefinite Programming and Its Applications

Cluster: Joint Cluster INV/SPON: Mathematical Programming/Optimization
Invited Session

Chair: Shuzhong Zhang, Professor, The Chinese University of Hong Kong, Dept. of SEEM, Shatin, NT, Hong Kong, zhang@se.cuhk.edu.hk

1 - Solving Maximum Likelihood Detection Problem Via Semidefinite Programming Relaxation

Zhi-Quan Luo, Dept. of Electrical and Computer Engineering, University of Minnesota, luozq@ece.umn.edu, Mikilai Kisialiou

In this talk, we describe our computational experiences with a semidefinite programming relaxation approach to the NP-hard problem of maximum likelihood detection in wireless communication. We show how ideas of warm start, dynamic problem size reduction can help significantly improve the efficiency and the accuracy of the solution. We also present computational comparisons with the state of the art Sphere Decoder for the same problem.

2 - A Semidefinite Programming Approach to Graph Realization

Yinyu Ye, Stanford University, yinyu-ye@stanford.edu

In this talk, we show that the semidefinite programming (SDP) can be used for realizing graphs in 3-dimensional space. Specifically, we use SDP duality theory to show that given a graph G and a set of length ranges on its edges, the optimal dual multipliers of a certain SDP give rise to a proper equilibrium stress for some realization of G . Using this result and other techniques, we then obtain an algorithm for realizing 3-realizable graphs. In particular, we show how to use SDP to pack unit-balls to achieve the largest kissing number.

3 - The Extended Trust-Region Subproblem and Its SDP Relaxation

Shuzhong Zhang, Professor, The Chinese University of Hong Kong, Dept. of SEEM, Shatin, NT, Hong Kong, zhang@se.cuhk.edu.hk, Wenbao Ai

In this talk we consider the problem of optimizing a quadratic function over the intersection of two ellipsoids (known as the extended trust region subproblem). It is well known that the SDP relaxation of this quadratic optimization problem may not be exact, in the sense that there might be a gap between the optimal value of the original QP problem and the optimal value of its SDP relaxation. In this talk, we shall present a polynomial-time verifiable condition (for a given problem instance) to testify whether or not such a gap exists.

■ WD11

S-Boardroom

Models for Military Applications

Contributed Session

Chair: Chen Chao, The Staff Room of Military Operation Research, School of Information System and Management, National Univ. of Defense Technology, No. 47, Road Deya, Borough Kaifu, Changsha, 410073, China, cougar008@sina.com.cn

1 - Research on the Effect of Information Chain Error upon Probability of Capturing Time Critical Target

Mao Chulong, The Staff Room of Military Operation Research, School of Information System and Management, National Univ. of Defense Technology, No. 47, Road Deya, Borough Kaifu, Changsha, 410073, China, maochulong@hotmail.com, Jichang Sha, Yiguang Ren, Bin Yu

The definition of information chain error from sensor to shooter is present. The formula for quantitating information chain error is constructed. Knots error elements are included in the formula. The function which independent variable is information chain error and which attribute variable is the probability of capturing time critical target (abr. TCT) is present. A case is studied. The factor which has greatest effect on the probability of capturing TCT is found in the case.

2 - Stochastic Shortest Path Formulation for a Marine Minefield Navigation Problem

Ruth Luscombe, PhD Student, University of Melbourne, Department of Mathematics and Statistics, Parkville, VC, 3057, Australia, r.luscombe@ms.unimelb.edu.au

We examine the problem of finding a safe path for a ship through a marine minefield. Firstly we must determine what information is available about the locations and the nature of the mine threats and how to quantify the risk posed to the transiting ship. In this work we consider a stochastic shortest path formulation of the problem and discuss possible network structures and algorithms.

3 - The Model of Chaff Centroid Jamming and Simulation Analysis for BVR Attacking

Chen Chao, The Staff Room of Military Operation Research, School of Information System and Management, National Univ. of Defense Technology, No 47, Road Deya, Borough Kaifu, Changsha, 410073, China, cougar008@sina.com.cn, Bin Yu, Xian-jin Bu, Jichang Sha

On the base of analyzing the mechanism of Chaff Centroid Jamming for BVR Attacking, the mathematical model of Chaff Centroid Jamming is built. The effect of Centroid Jamming on the anti-ship missile is evaluated by the computer simulation technique, and the tactic replied to Chaff Centroid Jamming is presented for BVR Attacking on given conditions.

WD12

S-Celestial Court-Jade

Issues in Information Systems

Contributed Session

Chair: Mark Srite, Assistant Professor, University of Wisconsin - Milwaukee, P.O. Box 742, School of Business, Milwaukee, WI, 53201, United States, msrite@uwm.edu

1 - A Decision Behavior Model for IT/IS Adoption of China Mainland Enterprise

Yiwen Li, Tongji University, Room501-5E Building 5E Miyun Road No.528, Shanghai, 200092, China, graceli9166@163.com

The objective of this paper is to gain a better understanding of factors influencing IT/IS adoption decision-making behavior of China mainland's enterprise. With the structural equation modeling, this paper generalized the adoption process model and key factors model on the base of a survey to 87 enterprises in China mainland. The research indicates, task-technology fitness, innovative organization culture and industry IT competition intensity have the prominent effects to adoption decision.

2 - A Complexity Measure Based on Information Contained in the Software

Dharmender Singh Kushwaha, Head of Dept./Research, MNNT, Allahabad, 211004, India, dharkush, Arun K.Misra

This paper attempts to empirically demonstrate the amount of information contained in a software and develops a concept of cognitive information complexity measure based on the information contained in the software. In this paper, an attempt has also been made to evaluate cognitive information complexity measure in terms of nine Weyuker properties, through examples. It has been found that all the nine properties have been satisfied by cognitive information complexity measure.

3 - Managing Evolutionary Ontologies in Semantic Web Service with MMF4Onto

Yangfan HE, Wuhan University, Wuhan University, Wuhan, 430072, China, heyangfan927@163.com

As one corner stone of semantic web service, ontology by its own part will experience some evolution. In order to ensure the consistency between ontologies with the same origin, some rules should be defined, registered and applied to constrain the evolution process. MMF4Onto specifies three abstract frameworks for the registration of ontology, ontology evolution rules and the evolution information respectively, which contributes to the final resolution for the evolution issues of ontologies.

4 - An Error Free Software Testing Technique

Mirza Baig, Assistant Professor, NED University of Engineering & Technology, Department of Computer Science & IT NED U, Karachi, Pakistan, mbaig2000@yahoo.com, Ansar Ahmad Khan, Wahab Uddin Usmani

Testing is defined as a single phase activity in software development processing. In this paper we propose a testing strategy consisting of the followings: A testing module to test at each stage of software development and a formal test bed (in MATRIX form). This will facilitate formal testing at each phase. A set of preventive measures will also be identified to formally specify and design the problem, unambiguously; which will reduce errors to a great extent.

5 - Impact of Indian Software Developers' Exposure to US Culture on IS Skills and Job Satisfaction

Mark Srite, Assistant Professor, University of Wisconsin - Milwaukee, P.O. Box 742, School of Business, Milwaukee, WI, 53201, United States, msrite@uwm.edu, Hemant Jain, Lin Ngo-Ye

Significant academic research has recently appeared on the topic of outsourcing. However, studies that examine culture and its impact on outsourcing personnel are needed. Data were collected from employees of a major Indian outsourcer. It was found that culture does affect both job skills and employee satisfaction.

WD13

S-Celestial Court-Pearl

Stochastic Inventory Models I

Contributed Session

Chair: Jiejian Feng, PhD student, IELM of HKUST, Tower A106, HKUST, Kowloon, Hong Kong, Hong Kong, 852, China, iefjx@ust.hk

1 - An Inventory System with Service Facilities and Markovian Arrival and Service Process

Sivakumar Balaubramanian, Senior Research Fellow, Madurai Kamaraj University, Palkalainagar, Madurai, 625021, India, sivabkumar@yahoo.com, Paul Manuel Devasahayam, Arivarignan Gunaseelan

We consider a continuous review inventory system with a service facility consisting of a finite waiting room and a single server. The customers arrivals form MAP and service times are according to MSP. Any arriving customer, who finds the waiting room is full, is considered to be lost. The joint probability distribution of the number of customers in the waiting room and the inventory level is obtained in the steady state case. Various stationary system performance measures are computed.

2 - An Inventory Model for Systems with Random Deal Offerings and Partial Backordering

Cerag Pince, PhD Student, Econometric Institute, Erasmus University, ERIM H9-01, P.O. Box 1738, Rotterdam, NL-3000, Netherlands, pince@few.eur.nl, Emre Berk

In this study we consider a single item continuous review inventory system with random deal offerings in which the supplier offers discounted prices at random points in time besides the regular prices. The demand is assumed to be deterministic and partial backordering is allowed. The inventory system is controlled according to the (r, R, s, Q) policy. We derive the exact closed form expressions of the optimal policy parameters and conduct a numerical study to investigate their sensitivity.

3 - A Periodic Inventory Model with Two Customer Classes and Constant Rationing

Karin Moellering, University of Cologne, Dept. of SCM&MS, Albertus-Magnus-Platz, Koeln, 50923, Germany, karin.moellering@uni-koeln.de, Ulrich Thonemann

We analyze a periodic single-item inventory system with one central warehouse maintaining stock to meet both, high and low priority demand. We apply a constant rationing policy and clear backorders optimally. For arbitrary demand distributions, we characterize the behaviour of the policy in the presence of a positive deterministic lead time. We present a new modelling approach, develop an exact optimization algorithm and establish the advantage of this stock allocation policy.

4 - Order-Based Backorders in Multi-Item (s, S) Inventory Systems

Jiejian Feng, PhD student, IELM of HKUST, Tower A106, HKUST, Kowloon, Hongkong, Hongkong, 852, China, iefjx@ust.hk, Liming Liu, Yat-wah Wan

A customer order in a multi-item inventory system can request several types of items, and is backlogged if any of the requested items is not available. We provide a sufficient condition for the inventory positions to be independent with uniform marginal distributions. Under this condition, we propose an exact method to evaluate the average order-based backorders, then propose tight bounds and accurate approximations.

WD14

S-Celestial Court-Coral

Applications in Health Care

Contributed Session

Chair: Abhiram Chakraborty, SRI Sairam Engineering College, Plot No 67, Fifth Main Road, Nanganallur, Chennai, TN, 600061, India, abhiram.chakraborty@gmail.com

1 - Accounting for Fractionation in Fluence Map Optimization in IMRT

Dionne Aleman, University of Florida, 303 Weil Hall, Gainesville, FL, 32611, United States, daleman1@ufl.edu, Edwin Romeijn, James Dempsey

The majority of IMRT treatment plans are not delivered in a single session, but rather as several daily treatments (fractions) over an extended period. The current practice of transforming a single FMO solution into fractionated solutions is suboptimal. We formulate and solve a model that simultaneously optimizes one fluence map per prescription dose level by treating each beamlet in each fraction as a variable and incorporating artificial doses to account for previously delivered fractions.

2 - The Magic Sticker- A Wireless, Battery Less Device for Continuous Health Monitoring

Abhiram Chakraborty, SRI Sairam Engineering College, Plot No 67, Fifth Main Road, Nanganallur, CHENNAI, TN, 600061, India, abhiram.chakraborty@gmail.com

A new wearable microphone that is both wireless and battery-less is presented. This system, called the magic sticker, can be worn on the human body for the purposes of continuous health monitoring and wearable computing. The sensor part of this system can be easily attached to the human skin and can capture human body sounds such as respiratory sounds and lung sounds, as well as surrounding sounds including the voice of the wearer, depending on attachment configuration.

■ WD15

S-Celestial Court-Amber

Decision Support Systems

Contributed Session

Chair: Mathias Salle, Senior Research Scientist, HP Research Labs, 1501 Page Mill Rd, Palo Alto, CA, 94304, United States, mathias.salle@hp.com

1 - A Web-based Logistics Management System for Agile Supply Chain Network Design

You Xiao, Mr., Nanyang Technological University, Singapore, NTU, Singapore, Singapore, youxiao@pmail.ntu.edu.sg

Online, on-demand and real-time availability of information to all members of a manufacturing system enables them to react quickly, efficiently, synchronously, and collectively to the changing market. This paper proposes an integrated web-based logistics management system for agile supply chain network design (ASDN). It supports modeling, analyzing and optimizing of supply chain network. A detailed case study of the Finland ABB Company has been undertaken and proves the validity of ASDN.

2 - The Consensus Decision Model: A Key Component for a Future Decision Support System

Bernard K. S. Cheung, GERAD and École Polytechnique de Montreal, GERAD-HEC, 3000, Chemin de la Côte Sainte-Catherine, Montreal, Quebec, H3T 2A7, Canada, bernard.cheung@gerad.ca, Eric W. T. Ngai

A management decision based on opinions from a team of experts has been commonly used. The classical theorem of Condorcet on consensus decision by voting infers some interesting results relating to possible enhancement of probability of making correct decision by a group. However its simple proof rests on some restrictive assumptions. By an in-depth re-examination of Condorcet's theory addressing the issues such as the difference in individual decision abilities and the inter-dependency within the group, we have derived a mathematical model that proves and extends his results to a group of individuals with different ability in making correct decisions. Our derivation includes some quantitative results based on which a prime decision maker (e.g. the CEO of a company) can select optimally a team of decision makers and then infer the best decision from their collective contributions. An extensive investigation on the effect of enhancing the group decision ability by attaching different weights to individuals in accordance to their decision abilities, though not making much sense in the case of political voting, is quite relevant to a group of decision makers where some of them are experts (or even non-human devices). Some important results so obtained together with extensive experimental verifications indicates that a simple and effective algorithm could be constructed and incorporated into a management Decision Support System.

3 - Formal Model for Decision-making Under Uncertainty Using the Balanced Scorecard

Mathias Salle, Senior Research Scientist, HP Research Labs, 1501 Page Mill Rd, Palo Alto, CA, 94304, United States, mathias.salle@hp.com

To support the widespread adoption of the Balanced Scorecard, decision support systems have been studied leading to Balance Scorecard design and reporting systems as well as support for selection and prioritization key performance indicators. Yet formal models for decision making under uncertainty have not been studied. In this paper, we present a formal framework for multi criteria decision making under uncertainty when criteria are modeled as objectives in balanced scorecards.

■ WD16

S-Celestial Court Amethyst

Applications

Contributed Session

Chair: Luisto Hagos, New Era University, Quezon City, Philippines, dochagosneu@yahoo.com

1 - Estimation of Standard Population Provided by Finance Department of Sichuan Province

Li Xuehong, Postgraduate, Sichuan University of China, Sichuan University, Chengdu, China, 610064, liscu@126.com, Guangzhong Liu

This article analyses the standard population provided by finance department of Sichuan province. According to different area and industry, it assesses the feature of the standard population provided by finance department of Sichuan province and estimate the financial expenditure on these persons.

2 - Garbage In, Garbage Out - The Important of Verification and Validation

Jan-Mou Li, University of Tennessee, 223 Perkins Hall, Knoxville, TN, 37996-2010, United States, jli21@utk.edu, Lee Han

Visualization of transportation models is an up-to-date technology. However, those data may be not precise enough for many reasons. This paper explores criteria for implementing transportation models with visualization technologies at first. Based on those criteria, a verification and validation process can be built. With the process, a model is demonstrated to check the continuous. The simulation results indicate this approach is necessary in implementing a transportation model with huge data.

3 - Modeling Study of Long-Stroke Valve-Controlled Asymmetrical Cylinder

Xiao Zhi-quan, Postdoctoral Researcher, College of Naval Architecture and Power, Naval University of Engineering, #339, Jiefang Street, Wuhan, Hubei, China, Wuhan, Hu, 430033, China, zhiquan.xiao@mail.nuaa.edu.cn, Xing Jifeng

With the consideration of compressibility flow, and the redefined load flow and load pressure, the mathematical model of long-stroke valve-controlled asymmetrical cylinder system is presented. The equivalent volume function, the function of equivalent volumes of cylinder's two chambers or the function of piston's position, is introduced, which reflects the influence of piston's positions in its long stroke on the dynamic performance of valve-controlled cylinder.

4 - A Study on the Phosphor Furnace Processing Parameters Model and Optimization

huang deyong, Vice Professor, Kunming University of Science and Technology, Kunming, 650093, China, hdy697@yahoo.com.cn

At present, mostly yellow phosphor production still locates the got-up or half-got-up control state due to capacity control theory basing on phosphor furnace is immature at home, and hasn't gotten across excellent processing parameters to produce. Basically, it utilizes experiential parameters to direct to produce, resulted in higher consuming energy, greater environment pollution, bigger fluctuant product quality and output. Therefore, phosphor furnace processing parameters optimization is the key of yellow phosphor production, is sticking point of saving energy and reducing consumption, and has guidance significance for realizing capacity of control technology of phosphor furnace.

5 - Unit Hydrograph Development for Flood Forecasting

Luisto Hagos, New Era University, Quezon City, Philippines, dochagosneu@yahoo.com

Several methods have been developed by known hydrologists all over the world for flood estimation which are now widely accepted and eventually gave gained a foothold in the world of hydrology. This paper presents one of the methods used in flood forecasting known as unit hydrograph, which is an early application of the theory of linear systems of hydrology.

WD17

H-Crystal Room 1

Demand-to-Supply System and SCM

Cluster: Special Sessions

Invited Session

Chair: Masayuki Matsui, The University of Electro-Communications, 1-5-1 Chofugaoka, Chofu-Shi, Tokyo, 182-8585, Japan, matsui@se.uec.ac.jp

1 - SCM Balancing: 2-MGM Chains and Integral Optimization

Manabu Motohashi, The University of Electro-Communications, 1-5-1 Chofugaoka, Chofu-Shi, Tokyo, 182-8585, Japan, motoha@se.uec.ac.jp, Masayuki Matsui

This paper presents the 2-chain model consisting of the MGM (Management Game Model), and formulates by the goal-seeking and balancing theory (Matsui, 2004). Then, the integral balancing in economics and reliability is discussed for win-win strategy.

2 - Progressive-Curve-Based Control Method and SC Planner

Hiroaki Fujikawa, IBM Japan Business Logistics Co. Ltd., 3-23-19 Kaigan, Minato-ku, Tokyo, 108-0022, Japan, E16806@jp.ibm.com, Masayuki Matsui

Overstocking and run out can be prevented by grasping change of demand-and-supply balance and quick action. The technique of automatically following demand fluctuation using the newsboy formulation and V-mask chart was developed and it was actually adapted by PC distribution industry and the wholesale business of liquor.

3 - Strategic Selection of Economic Assembly Systems Under Viable Demands

Tetsuo Yamada, The University of Electro-Communications, 1-5-1 Chofugaoka, Chofu-Shi, Tokyo, 182-8585, Japan, tyamada@se.uec.ac.jp, Satomi Kakefuda, Masayuki Matsui

This study compares the Assembly Line Systems (ALS) to the Cell Production Systems including Flexible Cell System (FCS) under viable demands using the pair matrix table by the production lot sizes and the number of stations, and discusses a strategic selection among them in view of profit and lead time.

4 - Cooperative and Competitive Order-acceptance Strategies for Markovian Make-to-order Systems

Hideaki Yamashita, Tokyo Metropolitan University, Minami-Ohsawa 1-1, Hachioji, Tokyo, 192-0397, Japan, hideak@comp.metro-u.ac.jp

We study a pair of make-to-order systems, in which each system can reject an order with low estimated price. We obtain state-dependent estimated price criteria for accepting orders to maximize an expected marginal profit in cooperative and competitive situations using Markov decision process.

WD18

H-Crystal Room 2

Reliability and Security Issues in Facility Location Planning

Sponsor: Location Analysis

Sponsored Session

Chair: Maria Paola Scaparra, University of Kent, Kent Business School, Canterbury, CT2 7PE, United Kingdom, M.P.Scaparra@kent.ac.uk

1 - Optimizing Inventory-Location Decisions in the Presence of Time-Sensitive Consumer Demand

Mozart Menezes, Assistant Professor, HEC School of Management, Paris, Département Management Industriel, et Logistique, Paris, 78351, France, menezes@hec.fr, Dmitry Krass, Oded Berman

We consider a problem of serving customer demand from a set of facilities where demand may be lost if the delivery cannot be made in time. Thus, both inventory and location decisions must be made simultaneously, taking into account fixed location costs, inventory-related costs and opportunity costs for lost demand. Such problems are often faced by internet-based retailers, such as Amazon.com. Both theoretical and computational results will be presented

2 - Reliability vs. Travel Distance Trade-offs in Facility Location Problems

Mozart Menezes, Assistant Professor, HEC School of Management, Paris, Département Management Industriel, et Logistique, Paris, 78351, France, menezes@hec.fr, Oded Berman, Dmitry Krass

We consider a generalization of the p-Median Problem where some of the facilities may not be operational due to disruption. Two cases are considered: (i) customers know which facilities are disrupted; (ii) no such information is available. We analyze the trade-offs between reliability and travel distance on a network, line and a plane and develop insights into the types of spatial patterns

that can be expected in each case.

3 - Models for Facility Hardening Decisions

Mark Daskin, Professor, Northwestern University, Dept. of IE/MS, 2145 Sheridan Road, Evanston, IL, 60208, United States, m-daskin@northwestern.edu, Sunil Chopra, Michael Lim

We extend an analytic model that captures the tradeoff between facility location costs and transportation costs to incorporate two types of facilities. One type is subject to failures, while the second, more expensive type of facility, does not fail. We derive analytic results for the minimum cost solution and extend the results to assess the value of information about the status of facilities. We compare the analytic model results to those of a similarly formulated discrete location model.

4 - Analysis of p-median System Vulnerabilities: Deterministic and Probabilistic Models

Maria Paola Scaparra, University of Kent, Kent Business School, Canterbury, CT2 7PE, United Kingdom, M.P.Scaparra@kent.ac.uk, Richard Church

Systems operations can be significantly disrupted by intentional strikes against facilities. We present mathematical models for quantifying worst-case and best-case losses of efficiency in p-median systems. The outputs of the two models can be used to draw the contour lines of the "reliability envelope". This envelope illustrates the range of efficiency loss due to attacks of different size. We consider deterministic models as well as models where the success of an attack is probabilistic.

WD19

H-Crystal Room 3

Web-based Decision Support Systems: Theory and Applications

Cluster: Web-Service Related Technology

Invited Session

Chair: Guohua Wan, Associate Professor, University of Macau, FBA, Uni. of Macau, Taipa, Macau, China, ghwan@umac.mo

1 - The IT Adoption and its Effect on the Supply Chain Performance in China

Houcai Shen, Professor, Nanjing University, Department of Management Science, Nanjing, JS, 210093, China, hcshen@nju.edu.cn

It has been shown that the Information technology has changed the way of business model. In this study, we study the level of information technology adoption in Chinese companies, and how Chinese companies change its supply chain management.

WD20

H-Jade Suite 1

Optimization I

Contributed Session

Chair: Nenad Mladenovic, Dr, Brunel University, School of Mathematics, Uxbridge, London, Ub8 3PH, United Kingdom, nenad.mladenovic@brunel.ac.uk

1 - A Common Method of Anti-Cycling Pivoting Rules in Solving Linear Programming

Zhao Qingzhen, School of Management, Shandong Normal University, Jinan, China, qzzhao@126.com, Yang Honglan

In this paper, we present a common method of anti-cycling pivoting rules in solving linear programming. This method includes the lexicographic method, Bland's rule and other methods as special cases. It is helpful to understand the essence of these methods as well as to simplify pivoting process and construct other methods for preventing cycling.

2 - Inexact Barzilai-Borwein Method for Saddle Point Problems

Yi-Qing Hu, State Key Laboratory of Scientific and Engineering Computing, P.O. Box 2719, Academy of Mathematics and System, Beijing, 100080, China, huyq@lsec.cc.ac.cn, Yu-Hong Dai

This paper considers the inexact Barzilai-Borwein algorithm applied to saddle point problems. To this aim, we study the convergence properties of the inexact Barzilai-Borwein algorithm for symmetric positive definite linear systems. Suppose that g_k and g_{k+1} are the exact residual and its approximation of the linear system at the k -th iteration, respectively. We prove the R-linear convergence of the algorithm if $\|g_k - k \cdot g_{k+1}\| \leq \|g_{k+1}\|$ for some small $n > 0$ and all k . To adapt the algorithm for solving saddle point problems, we also extend the R-linear convergence result to the case when the right hand term $\|g_k\|$ is replaced by $\|g_k - I\|$. Although our theoretical analyses cannot provide a good estimate to the parameter n , in practice we find that n can be as large as the one in the inexact Uzawa algorithm. Further numerical experiments show that the inexact Barzilai-

Borwein algorithm performs well for the tested saddle point problems.

3 - Rounding Tabular Data

Juan Jose Salazar Gonzalez, Professor, University of La Laguna, Tenerife, La Laguna, 38271, Spain, jjsalaza@ull.es

Tabular data is a collection of values, some of which are the result of adding others. The problem of rounding a tabular data consists of replacing each value by a multiple of a given base number such that the resulted tabular data satisfies the same mathematical equations as the unrounded one. The aim is to minimize a distance between the rounded and unrounded tables. We give a mathematical model and an algorithm to solve this problem, and compare with other approaches in the literature.

4 - An Efficient Implementation of Nelder-Mead Simplex Method

Enad Mladenovic, Dr, Brunel University, School of Mathematics, Uxbridge, London, UB8 3PH, United Kingdom, enad.mladenovic@brunel.ac.uk, QiuHong Zhao

The Nelder-Mead algorithm for unconstrained optimization has been used extensively. Despite of its age, it is still an enormously popular direct search method because it is easy to code and easy to use. Many its modifications are published in last 40 years. However, in all implementations the number of function evaluations per iteration is either $O(n \log n)$ or $O(n)$. We develop a heap data structure to store and update simplex vertices. Computer results compare our implementation with others.

■ WD21

H-Jade Suite 2

Understanding Consumers

Contributed Session

Chair: Richard Colombo, Professor, Fordham University, 113 W 60 Street, New York, NY, 10023, United States, colombo@fordham.edu

1 - Modeling Diffusion Patterns of TV Programs

Xiaoling Lu, PhD Candidate, City University of Hong Kong, Department of MS, City University of Hong Kong, Hong Kong, Hong Kong, msxllu@cityu.edu.hk, Hing-Po Lo

With people meter data, this paper examines the audience viewing behavior and the diffusion patterns of TV programs. A new diffusion model based on hazard rate analysis is proposed and MLE method is applied to fit the model with the empirical data. The model's performance is better than existing models in terms of MAD, MSE, and n-step(s)-ahead forecast. Finally proportional-hazard model is investigated and implications of the model for the marketing of TV programs are discussed.

2 - The Myths and Realities of 18-49: Consumer Age, Brand Loyalties, and New Product Trial

Pavitra Jindahra, Faculty of Marketing, Sasin Graduate Institute of Business Administration, Chulalongkorn University, Sasa Patasala Building, Phayathai Rd., Pathumwan, Bangkok, 10330, Thailand, pavitra.jindahra@sasin.edu, Vishal Singh

A fundamental belief in the advertising industry is that younger consumers have less well-formed brand preferences and can be swayed into becoming loyal to another brand, resulting in higher advertising rates for programs geared towards younger audiences. In this paper, we investigate the differences in purchase behavior of consumers in different age groups in the consumer packaged goods industry in terms of brand loyalties and their propensity to try new products.

3 - Asymmetry of Consumer Satisfaction in Word-of-Mouth

Yanqun He, City University of Hong Kong, 83 Tat Chee Avenue, Kowloon, Hong Kong, China, msheya@cityu.edu.hk

This study examines the direct relationship between consumer satisfaction and word-of-mouth by investigating consumer complaint and appraisal in relation to three antecedents of WOM, i.e., consumer satisfaction, assessed value and perceived. Findings of the study imply an asymmetric influence of satisfaction in affecting consumers' positive (appraisal) and negative (complaint) WOM.

4 - Portfolio Size of Brand Purchases in Dirichlet Markets

Richard Colombo, Professor, Fordham University, 113 W 60 Street, New York, NY, 10023, United States, colombo@fordham.edu

Buyers are rarely 100% loyal to a brand but nor do they buy all brands in a category. Instead they are loyal to a portfolio of brands. Within this portfolio, they buy more or less randomly according to their preferences. But what is the size of their brand portfolios? What does it depend on? How does portfolio size vary with other measures of brand buying such as penetration and average purchase frequency? The well-known Dirichlet model of buyer behavior is used to answer these questions.

Wednesday, 3:30pm - 5:00pm

■ WE01

S-Tang II

Measuring Quality

Contributed Session

Chair: Priyantha Wijayatunga, Doctoral student, Tokyo Institute of Technology, Department of Mathematical and Computing, Tokyo, 152-8552, Japan, spwijay@is.titech.ac.jp

1 - A Model-Free Method for Person Fit in Standardized Tests

Ronald Armstrong, Professor, Rutgers University, MSIS Department, 180 University Avenue, Newark, NJ, 07102-1895, United States, r.d.armstrong@att.net, Zachary Stoumbos

Person fit refers to whether or not a test-taker consistently responds to items in a standardized test. It is critical in maintaining the scoring quality of the test. Most person-fit procedures assume a specific response model. This work presents a model-free, person-fit procedure based on a cumulative sum (CUSUM) statistic that uses only the response pattern generated by each test taker.

2 - Optimal Preventive Maintenance and Quality Control Policies for Two-State Processes

Sofia Panagiotidou, Aristotle University, University Campus, Thessaloniki, Greece, span@auth.gr, George Tagaras

We develop a model for joint preventive maintenance and quality control policies that are applicable to equipment subject to quality shifts and failures. The equipment starts its operation in the in-control state but it may shift to an out-of-control state before scheduled preventive maintenance, resulting in lower production revenues and higher failure rate. The objective is to derive the optimal control frequency as well as the optimal maintenance times for both quality states.

3 - Maximizing Conditional Likelihood of Bayesian Network Classifiers using Markov Properties

Priyantha Wijayatunga, Doctoral student, Tokyo Institute of Technology, Department of Mathematical and Computing, Tokyo, 152-8552, Japan, spwijay@is.titech.ac.jp, Mase Shigeru

Bayesian networks are a popular classification tool. Usually, their parameters are learnt in a generative way, that is by maximizing the likelihood. Presently there is a considerable interest in learning parameters through maximization of the conditional likelihood. We show how to do this task through decomposition of conditional likelihood function.

■ WE02

S-Tang I

Knowledge Resource

Cluster: Knowledge-Based Resource Management
Invited Session

Chair: A. D. Amar, Professor (Strategy & Policy) & Director of MBA Assessment, The Stillman School of Business, Seton Hall University, 650 Kozlowski Hall, South Orange, NJ, 07079, United States, amaramar@shu.edu

1 - Automated Decision Evaluation in Collaborative Teams

Sriram Bhamidipati, Haya Ameya, 28719 eton glen, Farmington hills, mi, 48331, United States, sriram_bhamidipati@yahoo.com

The paper deals with basic visualizations of individual knowledge metrics, using OR to provide a "summary" of these metrics and a methodology to arrive at a balanced metric for collective use. It further expands the method by associating affinity/weights to the individual decision and decision-to-decision to provide a framework for the overall decision evaluation in a hierarchical decision tree.

2 - Factors Affecting Knowledge Contribution-Based on Analysis of Knowledge Contributors' Behavior on KMS

Soo Jin Hahn, Ewha Womans Univ. College of Business Administration, 11-1 Daehyundong Seodaemungu, Seoul, 120750, South Korea, soojinhahn@yahoo.com, Hyo-Gun Kym, Hee Dong Yang

The goal of research is to better understand the relation between individuals' behavior and knowledge contribution on KMS and find factors affecting knowledge contribution on KMS. Social Exchange Theory is applied to develop a model, and it is empirically tested through KMS click-stream data of a company. Result shows that reciprocity and monetary compensation have significantly positive effects on knowledge contribution, but reputation, scores in knowledge usefulness and centrality don't.

3 - An Agent-based Framework for Decision Support in Financial Knowledge Management

Wei-Hsiao Wang, Student, Graduate School of Management, Yuan Ze University, 135, Yuang Tung Rd., Chung-Li, TW, 320, Taiwan, s899602@mail.yzu.edu.tw, Hilary Cheng, Yi-Chuan Lu, Calvin Sheu

This framework has been partially implemented and has been proven to be a viable implementation for agent-based approaches for decision support in financial knowledge management. We apply our framework to the domain of security investment industry. The ontology of the financial knowledge represented as XML schema in the FKMS can support not only the acquisition of financial knowledge created by domain expert, but also the maintenance, reusing, and the sharing of that knowledge.

4 - Operationalizing Cross-border Knowledge Sharing

C-C. Fatima Wang, Research Fellow, University of Cambridge, 6 Belvoir Terrace, Cambridge, CB22AA, United Kingdom, ccfw2@cam.ac.uk

With increasing success of overseas units, headquarters must seek new strategic directions to leverage knowledge resources worldwide. Conflict potential within multinational corporations exists by the very nature of diversity. This paper looks at 'centralization versus decentralization' dilemmas in cross-border knowledge sharing. Action research with a multinational retailer reveals tactics for operationalizing the strategy of 'customized globalization' for enhanced performance.

WE04

S-Ballroom B

Future Development of Mass Customization

Cluster: Mass Customization in Manufacturing
Invited Session

Chair: Liping Fang, Department of Mechanical and Industrial Engineering, Ryerson University, 350 Victoria Street, Toronto ON, M5B 2K3, Canada, lfang@ryerson.ca

Co-Chair: Qin Hai Ma, Professor, School of Business Administration, Northeastern University, School of Business Administration, Northeastern University, Shenyang, 110004, China, qhma@mail.neu.edu.cn

1 - The State of Mass Customization Research and Practice

Frank Piller, MIT Sloan School of Management, 50 Memorial Dr, E52-513, Cambridge, MA, 02139, United States, piller@MIT.EDU

The opportunities of mass customization are acknowledged as fundamentally positive by empirical studies and several companies are successfully operating after this business model. But large scale mass customization operations seem to be still limited. The paper discusses a number of propositions about the state and genus of mass customization as a distinctive business model. This will also include a review of recent research in the area and a discussion of promising fields for future study.

2 - Development of an Online Iterative Combinatorial Auction System

Liping Fang, Department of Mechanical and Industrial Engineering, Ryerson University, 350 Victoria Street, Toronto ON, M5B 2K3, Canada, lfang@ryerson.ca, Yucheng Wang

An online system for auctioning multiple items each of which has a single unit simultaneously is presented. Bidders can bid for any bundle of items iteratively. A new auction mechanism and a novel winner determination algorithm are developed. The system can be utilized in business-to-business transactions.

3 - Product Family Design and Platform-Based Product Development: Status and Promise

Jianxin (Roger) Jiao, Nanyang Technological University, School of Mechanical & Aerospace Engineering, SG, SG, Singapore, jiao@pmail.ntu.edu.sg, Timothy W. Simpson, Zahed Siddique

Product family design and platform-based product development has received much attention over the last decade. This paper provides a comprehensive review of the state-of-the-art research in this field. A decision framework is introduced to reveal a holistic view. The review includes fundamental issues and definitions, product portfolio and product family positioning, platform-based product family design, manufacturing and production, as well as supply chain management. Major challenges and future research directions are also discussed.

WE05

S-Ballroom C

Cutting and Packing III

Cluster: Cutting and Packing
Invited Session

Chair: Lai-Soon Lee, Mr., Department of Mathematics, Faculty of Science, Universiti Putra Malaysia, Serdang, Selangor, 43400, Malaysia, l.s.lee@soton.ac.uk

1 - Cutter-Path Generation for Hard Material

Shinji Imahori, Department of Mathematical Informatics, Graduate School of Information Science and Technology, University of Tokyo, 7-3-1 Hongo, Bunkyo-ku, Tokyo, 113-8656, Japan, imahori@simplex.t.u-tokyo.ac.jp, Kokichi Sugihara, Motoki Kushiya, Takeru Nakashima

An algorithm for a wire-cutter path for pieces packed on two dimensional hard material is proposed. The generated cutter path satisfies the following physical conditions. The pieces drop when they are cut off, the pieces have exact shapes along prespecified edges, the remaining material is strong enough against the gravity force, and the cut-off pieces do not require additional cut.

2 - A Genetic Algorithm for Two-Dimensional Bin Packing Problems with Due Dates

Lai-Soon Lee, Mr., Department of Mathematics, Faculty of Science, Universiti Putra Malaysia, Serdang, Selangor, 43400, Malaysia, l.s.lee@soton.ac.uk, Julia A. Bennell, Chris N. Potts

A new variant of two-dimensional bin packing problem is introduced, where bins have fixed processing times, and rectangles have due dates. A genetic algorithm is developed with the alternative fitness function of minimising the maximum lateness and the number of bins. Computational results of local search algorithms are presented.

3 - An Efficient Heuristic Approach to Two-dimensional Bin Packing Problem

Jiamin Liu, Ms, Shenyang University of Technology, Shenyang university of Technology, Shenyang, China, jjiamin.liu@luton.ac.uk, Youqun Huang, Malcolm Keech, Guangkun Ma, Yong Yue

We present a new heuristic algorithm for 2D bin packing problem which combines a greedy with backtracking algorithm. A concise and flexible representation and merging of the remaining areas is proposed. Experimental results have been shown that the performance of the algorithm is superior to that of other approaches published.

WE06

S-Sung I

Measuring Productivity and Management of Projects

Contributed Session

Chair: Benny Lianto, University of Surabaya, Jl Raya Kalirungkut, Surabaya, Indonesia, b_lianto@ubaya.ac.id

1 - Client-contractor Bargaining on Net Present Value in Project Scheduling with Limited Resources

Gunduz Ulusoy, Professor of Industrial Eng, Sabanci University, Orhanli, Tuzla, Istanbul, 34956, Turkey, gunduz@sabanciuniv.edu, Nursel Kavlak, S. Ilker Birbil, Funda Sivrikaya Perifoölu

Here, the client-contractor bargaining problem in the context of multi-mode resource constrained project scheduling is considered. The objective of the client is to minimize the net present value of the payments to the contractor, whereas the objective of the contractor is to maximize the net return. The bargaining objective combines the objectives of both the client and the contractor through the use of bargaining parameters.

2 - Optimal Investment Decision: Project-level Empirical Test

Bin Song, Lecturer, Department of Investment, Central University of Finance and Economics, 38 South College Road, Haidian District, Beijing, China, sonb@cufe.edu.cn, Fotios Harmantzis, Linyan Miao

We investigate a theoretical framework for optimal investments by using dynamic programming and contingent analysis. Projects conducted by two listed firms in China are studied. Comparing the project value with the critical value, we find that investment for both projects should not be taken. We discuss several issues which influence optimal investment decision making, e.g., stochastic process, adequacy of assumptions, and bias of parameter estimate.

3 - The Need for Comprehensive and Total Productivity Measurement Models: case study in Service Industry

Benny Lianto, University of Surabaya, Jl Raya Kalirungkut, Surabaya, Indonesia, b_lianto@ubaya.ac.id

Abstract This paper will show the application of comprehensive and total productivity measurement examples in two cases in service organization: 1) integration internal (tangible aspects) and external (intangible aspects) efficiency using Data envelopment Analysis (DEA) and 2) measuring total efficiency (Internal, external, and capacity) using OMAX modification.

WE08

S-Ching

Queuing Models

Contributed Session

Chair: Yao Lu, Graduate Student, Manage school of Sichuan University, Sichuan University 24, South Section 1, Chengdu, SC, 610065, China, lukeluyao@163.com

1 - PIM (A Randomly Monitoring M/G/1 Queue with the PIM Service Policy)

Jiyeon Lee, Associate Professor, Department of Statistics, Yeungnam University, 214-1 Dae-dong, Kyeongsan, South Korea, leeji@yu.ac.kr

We consider the PIM service policy for an M/G/1 queue in which the service rate is increased from 1 to M if the level of workload exceeds a threshold lambda at randomly monitoring time. The stationary distribution of the workload is explicitly obtained through the level crossing argument.

2 - A (2-1/r) Approximation Algorithm for Parallel Machines with Flexibility r

Hark-Chin Hwang, Assistant Professor, Department of Industrial Engineering, Chosun University, 375 Seosuk Dong, Dong-Gu, Gwangju, 501-759, South Korea, hchwang@chosun.ac.kr

We consider m identical parallel machine scheduling where each of n jobs can only be processed by some subset of machines. The flexibility of the machine system is defined as the maximum number eligible machines to which each job can be assigned. The objective is to find a schedule with minimum makespan. For the case with flexibility $r \leq m$, we propose an algorithm which guarantees a schedule with makespan at most $2-1/r$ times optimum.

3 - A Customer-oriented Approach for Determining Transient Waiting Time Major Moments in a FCFS Queue

Avi Herbon, Bar-Ilan University, Ramat-Gan, Israel, 52900 and Dept. of Management and Industrial Engineering, College of Judea and Samaria, Ariel, 44837, Israel, avher@bezeqint.net

The customer-oriented relevance of waiting time arises only when the individual has arrived in the system, i.e. only when the system is not empty. By approximating the departure process as continuous, we derive the transient major moments of waiting time from that new viewpoint for a general FCFS G/G/1/N queueing system. The suggested results express the relations between waiting time and queue length for non-steady state and over capacity conditions.

4 - The Feasibility of Apply the Virtual Reality into the Real Estate Market in Chengdu

Yao Lu, Graduate Student, Manage school of Sichuan University, Sichuan University 24, South Section 1, Chengdu, SC, 610065, China, lukeluyao@163.com, Guangzhong Liu

Virtual reality is a kind of technique which uses the computer to construct a living likeness environment. This paper is concentrated on analyzing the feasibility of applying the virtual reality into the real estate market in Chengdu. Clients could know about the house he or she wants to by much better through the internet where uses the virtual reality. It will save much time and money for both clients and estate agents.

WE09

S-Ming I

Production Planning and Scheduling

Contributed Session

Chair: Jiyin Liu, Professor, Loughborough University, Business School, Loughborough, LE, LE11 3TU, United Kingdom, J.Y.Liu@lboro.ac.uk

1 - Models for One-dimensional Cutting Stock Problem with Steel Bars Sequencing

Juey-Fu Cheng, Assistant Professor, Department of Civil and Ecological Engineering, I-Shou University, I, Section 1, Hsueh-Cheng Rd., Ta-Hsu Hsiang, Kaohsiung County, 840, Taiwan, chengjf@isu.edu.tw, Yusin Lee

A model is established to solve the cutting plan of steel bars in construction projects. The model integrates the construction scheduling with cutting process. The model is also modified to simultaneously minimize the maximum number of open stacks in cutting process. Cases are presented to illustrate the practical applications.

2 - Sequential Solution Approach for Large Scale Planning Problems

Devin Li, Rules Engineer, Intel Products (Shanghai) Ltd, No. 999 Ying Lun Rd., Waigaoqiao Free Trade Zone, Pudong, Shanghai, 200131, China, devin.li@intel.com, Shamin A Shirodkar, Darlene Monoy

This paper presents a sequential solution approach for a large scale multiple objective linear programming model that has been developed to improve Intel's supply chain. Compared with the normal way which solves the weighted objective function at one time, this approach ensures the objectives are met in the order of importance, and it mitigates the complex task of dealing with too many weights.

3 - Optimal Partial Harvesting Schedule: An Impulsive Control Approach

Run Yu, University of Hawaii at Manoa, 3050 Maile Way, Gilmore 111, Honolulu, HI, 96822, United States, run@hawaii.edu, Pingsun Leung

In this paper, a partial harvesting model that is capable of addressing discrete partial harvesting for aquaculture operations is developed using impulsive control theory. A numerical example employing an open-ended logistic density-dependent growth function indicates that partial harvesting can improve the potential performance of an aqua-farming system.

4 - Cyclic Multi-Hoist Scheduling: Practical Model and a Branch and Bound Solution Strategy

Yun Jiang, Assistant Professor, Bilkent University, Bilkent, Ankara, 06800, Turkey, jiangyun@bilkent.edu.tr, Jiyin Liu

We transform the hoist non-collision requirement to some compact linear constraints and formulate multi-hoist scheduling problem as mixed integer programming model. A branch and bound strategy is developed to speed up model solving procedure. Some examples are given to show that the problem with moderate size (20 tanks and 3 hoists) can be solved to be optimal within reasonable CPU time.

WE12

S-Celestial Court-Jade

Information and Decision Support Systems

Contributed Session

Chair: Guangcun Shan, Dr., Institute of Advanced Materials and Technology (IAMT), Fudan University, 220 Handan Road, Shanghai 200433, China, Shanghai, 200433, China, spinor@163.com

Co-Chair: Rajini Girinath, Assistant Professor, MNM Jain Engg College, Dept. of CSE, MNM Jain Engg college, Chennai, 600096, India, dgirinath@yahoo.com

1 - Role of Telepresence in Web site Complexity Effects

Reetika Gupta, Lehigh University, Marketing Department, 621, Taylor Street, Bethlehem, PA, 18015, United States, reg205@lehigh.edu, Sucheta Nadkarni

This research examines how the two facets of telepresence (arrival and departure) experienced at a web site mediate the effects of web site complexity on the evaluations toward the web site. The findings indicate that while structural complexity at web site leads to a stronger effect on attitudes than intention to revisit, through the arrival facet of telepresence, outcome complexity has a stronger effect on the intention to revisit, through the departure facet of telepresence.

2 - A Decision Support System Framework for Call Center Management

Asli Sencer Erdem, Assist. Professor, Bogazici University, Dept. Of Management Information Systems, Hisar Campus, Bebek, Istanbul, 34342, Turkey, asli.erdem@boun.edu.tr, Burak Gedikoglu

Shift design and workforce allocation are the major problems in call center management. The aim of the call center manager is to allocate and dynamically update the workforce so that the incoming calls are answered in the shortest possible time, above certain service level measures. In this study a framework for a DSS is designed which is based on the optimization and simulation techniques. The DSS environment is illustrated with numerical examples.

3 - Design of a Multi-agent Web Mining System

Guangcun Shan, Dr., Institute of Advanced Materials and Technology (IAMT), Fudan University, 220 Handan Road, Shanghai 200433, China, Shanghai, 200433, China, spinor@163.com

In this paper, we present the collaborative Spider, a multi-agent system designed to provide post-retrieval analysis and enable across-user collaboration in Web search and mining. This system allows the user to annotate search sessions and share them with other users. We also report a user study designed to evaluate the effectiveness of this system. We also catalog and analyze several different types of user collaboration behavior observed in the context of Web mining.

4 - Point to Multipoint Wireless Communication Using HDLC Protocol

Rajini Girinath, Assistant Professor, MNM Jain Engg College, Dept. of CSE, MNM Jain Engg College, Chennai, 600096, India, dgirinath@yahoo.com, Selvan Peter

The data link control layer provides the error-free movement of data between the Network Addressable Units (NAUs) within a given communication network via the High Data Link Control (HDLC) Protocol. This system is conceived for air defense environment and provides command and control support to 8 batteries through wireless communication. For wireless communication (DCE) Radio Management Units (RMU) are kept between Group Control Center (GCC) and Battery Control Center (BCC).

WE13

S-Celestial Court-Pearl

Stochastic Inventory Models II

Contributed Session

Chair: Murat Fadiloglu, Assistant Professor, Bilkent University, Endustri Muh Bolumu, Kat:3 Oda:309, Ankara, 06800, Turkey, mmurat@bilkent.edu.tr

1 - Fill Rates and Ready Rates in an Inventory Control System with a Continuous Review (r, q) Policy

Anders Thorstenson, Professor, Aarhus School of Business, Fuglesangs allé 4, Aarhus, DK-8530, Denmark, ath@asb.dk, Christian Larsen

The fill rate is perhaps the most commonly applied performance measure in inventory management. In this paper we differentiate between a volume fill rate and an order fill rate and compare their performance to that of ready-rate service measures. The single item, single stage inventory system considered is controlled by a continuous review (r, q) policy. Demand is assumed to be generated by a compound Poisson process.

2 - Modelling Transshipment Decisions in Multi-location Inventory Systems

Daniel Black, Management School and Economics, University of Edinburgh, 50 George Square, Edinburgh, EH8 9JY, United Kingdom, Dan.Black@ed.ac.uk, Kevin Glazebrook, Tom Archibald

We investigate transshipment policy within periodic review multi-location inventory systems. Specifically, policy when a demand is made for an out of stock item. These systems can be modelled using stochastic dynamic programming (SDP), but the approach suffers from the curse of dimensionality. We develop simple index heuristics based on approximate solutions to the SDP model. Simulation is used to establish the quality of these heuristics.

3 - An Optimal Ordering Policy for Seasonal Products with Discount Sales

Katsushige Sawaki, Professor, Nanzan University, 27 Seirei, Seto, 489-0863, Japan, sawaki@nanzan-u.ac.jp, Hiroyuki Wakinaga

In this paper we consider an inventory control model for seasonal products in which the planning horizon consists of two periods for normal and discounts sales. We explore an optimal ordering policy of the two period inventory model for the seasonal product and the actual data of shoes sales are used numerically to compute an optimal order quantity.

4 - Application of fBm in an Investment Constrained Multi-item (Q, r) Inventory Model with Backorder

Shih-Hao Chou, NTUST, 43 Keelung Road, Section 4, Taipei, Taiwan, M9301003@mail.ntust.edu.tw, Shuo-Yan Chou

The optimal policies considering the marginal shortage costs on an investment constrained multi-item (Q,r) inventory system with lead time demand being influenced by the "Hurst exponent" have not yet been explored. This paper focuses on the application of fractional Brownian motion on such demand pattern. The objective is to formulate a model that minimizes the expected value of approximate total annual cost and to obtain an optimal inventory policy.

5 - An Embedded Markov Chain Approach to the Analysis of Inventory Systems under Rationing

Murat Fadiloglu, Assistant Professor, Bilkent University, Endustri Muh Bolumu, Kat:3 Oda:309, Ankara, 06800, Turkey, mmurat@bilkent.edu.tr

In this paper, we propose a new method for the exact analysis of lot-for-lot inventory systems with backorders under rationing policy. When such an inventory system is sampled at multiples of leadtime, the state of the system evolves according to a Markov chain. We provide a recursive procedure to generate the transition probabilities of the embedded Markov chain. We obtain the steady-state probabilities of interest with desired accuracy by considering a truncated version of the infinite chain.

WE14

S-Celestial Court-Coral

Health Care Issues

Contributed Session

Chair: Franklin Carter, Lehigh University, College of Business and Economics, 621 Taylor Street, Bethlehem, PA, 18015, United States, fcarter@lehigh.edu

1 - The Appropriate Number of Physicians at the Clinic

Seongmoon Kim, Assistant Professor, Yonsei University, School of Business, Seoul, South Korea, kims@yonsei.ac.kr

The arrival rate of patients to the clinic changes over time, resulting in bottlenecks. We present an application of queueing theory to find out the appropriate level of physicians at the clinic to make patient flow efficient. We provide numerical evaluation based on the actual data.

2 - An Intracellular Delay-Differential Equation Model of the HIV Infection

Rujira Ouncharoen, Dr., Chiangmai University, Department of Mathematics Faculty of, Science Chiangmai University, Chiangmai, 50200, Thailand, rujira@chiangmai.ac.th, Thongchai Dumrongpookaphan

Models of virus infection that include intracellular delay are more accurate representations of the biological data. We develop and analyze a model of HIV infection that considers the interaction among a replicating virus, CD4+ T-cell and the immune response. We then investigate the intracellular delay effect on the stability of the endemically infected steady state. Criteria are given to ensure that the infected steady state is asymptotically stable for all delays.

3 - An Analysis of Detailing Intensity and Presentation Order in the Pharmaceutical Industry

Franklin Carter, Lehigh University, College of Business and Economics, 621 Taylor Street, Bethlehem, PA, 18015, United States, fcarter@lehigh.edu, James Dearden

For pharmaceutical firms the important decisions are how often to call on each doctor and the order in which to detail each drug. Competitors reactions may effect those decisions. We examine strategic complements and substitutes in detailing intensity and in the order of detailing. With our results we are able to measure the competitive interactions among pharmaceutical representatives. In doing so, are able to characterize whether detailing exhibits strategic complements or substitutes.

WE15

S-Celestial Court-Amber

Leadership and Team Management

Contributed Session

Chair: Julian Dormann, P.h.d. student, University of Muenster, Leonardo Campus 18, Muenster, 48149, Germany, dormann@ug.uni-muenster.de

1 - Applied Management Science

Erik Johnsen, Professor, oecon.dr., Center for Applied Management Studies, Bakkevej 11 B, DK-3460 Birkerød, Denmark, erik.johnsen@mrei.dk

In order to get under the skin of managerial behavior The Center for Applied Management Studies at The Copenhagen Business School, Denmark has organized a network of 70 senior researchers, each one being a retired CEO. They analyse their managerial peak experiences and publish books filled with local wisdom. Preliminary results are rendered at the conference.

2 - Centralization of Franchising Networks and DEA-Efficiency: Property-Rights and Agency Perspectives

Julian Dormann, P.h.d. student, University of Muenster,
Leonardo Campus 18, Muenster, 48149, Germany,
dormann@ug.uni-muenster.de, Thomas Ehrmann

This paper empirically investigates the relative efficiency of franchise systems using Data Envelopment Analysis. Following recent calls for research, we study the degree of centralization in decision-making as the primary driver for efficiency. Consistent with property-rights and agency theory, we find that the relationship between centralization and efficiency is moderated by the vertical distribution of intangible knowledge assets and the appropriate use of incentive mechanisms.

■ WE18

H-Crystal Room 2

Logistics Systems

Contributed Session

Chair: Dirk C. Mattfeld, Professor Dr., Department of Business Information Systems, Abt-Jerusalem-Str. 4, Braunschweig, 38106, Germany, d.mattfeld@tu-bs.de

1 - Impact of Cross Aisles in a Rectangular Warehouse: An Empirical Analysis

Gurdal Ertek, Sabanci University, Orhanli, Tuzla, Istanbul, 34956, Turkey, ertekg@sabanciuniv.edu, Bilge Kucuk Inel

Cross aisles perpendicular to the storage blocks and main aisles in a rectangular warehouse can bring significant savings in order picking costs. We presents results of extensive simulation studies where we analyze equal-length and variable-length storage block sizes. We conclude that allowing variable-length storage block sizes (unequally spaced cross aisles) does not bring significant savings. We also reflect our findings on the ideal number of cross aisles.

2 - A Heuristic Approach to Solve the Corridor Alignment Problem

John Hou, Senior Consultant, IBM Business Consulting Service,
4F No.7 Song-Ren Road, Taipei, 105, Taiwan,
kwhou@tw.ibm.com, Reha Uzsoy, Srinivas Peeta

A service corridor is defined as a continuous volume between two points in space through which service is provided. Examples include the design of highway alignment, positioning of subsurface tunnels, layout of power transmission facilities, and air transport routes. In this research tabu search algorithm is used to obtain approximate solutions to the corridor alignment problem. Theoretical bounds and conceptual insights are determined using the Lagrangian relaxation method.

3 - Freight Mode Choice in Logistics Corridor Based on Genetic Algorithm

Zhuqing He, Management School, Xi'an Jiaotong University,
Xi'an, China, hezhuqing666@sina.com

Freight mode choice is a key problem in multimodal transport, but there are seldom papers, which are based on quantitative analysis. The purpose of this paper is to outline a methodology for the analysis of mode choice in freight transportation. An integral program model is established to choose freight mode in logistics corridor and Genetic algorithm is applied to solve this problem in this paper. An example indicates that the method is efficient in practice.

4 - Allocation of Storage Space for Transshipment in Vehicle Distribution

Dirk C. Mattfeld, Professor, Dr., Department of Business Information Systems, Abt-Jerusalem-Str. 4, Braunschweig, 38106, Germany, d.mattfeld@tu-bs.de

The planning of transportation and storage capacity over time is addressed. In intermodal transshipment terminals, charges of finished vehicles compete for storage space in spatially distributed storage locations of finite capacity. The Evolutionary Algorithm proposed evolves a period-oriented capacity utilization strategy. This capacity utilization strategy then controls a construction heuristic which assigns tasks to periods and storage locations to tasks.

■ WE20

H-Jade Suite 1

Optimization II

Contributed Session

Chair: Vasumathi Arumugam, Sr.Lecturer, Vellore Institute of Technology, Vellore-14, Tamil Nadu, Tamil Nadu, 632 014, India, vaa72@yahoo.co.in

1 - Use of Simulated Annealing Techniques to Solve Aquaculture Distribution Problems

Earl J. Wang, Professor, National Pingtung University of Science and Technology, 1 Hsueh-Fu Rd., Nei Pu Hsiang, Pingtung, 912, Taiwan, second@mail.npust.edu.tw

This work utilizes simulated annealing techniques to formulate an optimal model for solving aquaculture distribution problems while considering sole supply source with multi-customers transport in terms of vehicle routing problems. The model implementation is designed as several scenarios relevant with factors above and the results bolster the decision of distribution development for aquaculture products.

2 - A Research on the Selection of the Most Reliable Route in the Traffic Network

Depin Tang, Shanghai Command College of Armed Police Forces,,
No.1010 Ling Nan Road, Shanghai, 200435, China,
jflcecn@163.com, Jianfeng Li

As a developing platform of the digital map of local area or major cities, this paper tries to presents the way of building the most reliable route mold in the traffic network for the purpose of putting across the designated travel. The traveler selects the route on the basis of the prediction of the time needed to pass through a single or the whole line by way of calculating the length of the distance between the start and destination and predicting the possible rate of traffic flow according to the road classification. The relevant routes discussed in this article are designed under two different kinds of situation: one is that the nodes and sections of a highway remain normal, and we just take it for granted that the rate of traffic flow is a stochastic variable varying with the time. Another is that if there are damages in certain nodes and sections of a highway, a correct estimation of traffic condition should be made according to the possibility and degree of the damages. The possibility of damages on highways are worked out in terms of the probability of the discrete points in the time axes. To analyze easily, the intervals of the discrete points can be assumed as $\delta\#916;t$, and the stochastic data which are evenly distributed should be made out for every unit of time and the stochastic data on the computer can help to estimate whether the road is damaged. When damages are confirmed, write down the damage degree to the input window of the digital map so as to decide whether the damages can be repaired within the given time. Travelers just keep waiting if the problem can be solved. Otherwise they select the secondary reliable route, and the rest can be deduced accordingly. By studying the set mold, the accurate calculations can be obtained, including the time for the travelers to complete the whole journey, the rate of traffic flow on the way, the conditions of the nodes of the highway network and other relevant information.

3 - Integrated Inventory-Transportation with Flexible Vehicles Constraint in a Finite Planning Horizon

Zhendong Pan, PhD., Northeastern university, China,
Northeastern university, 135#, Shenyang, LN, 110004, China,
ZhendongPan@163.com, Tang Jiafu, Yi Han, Lifeng Mu

We investigate the integrated inventory-transportation problem under flexible vehicles constraint. Considering the vehicle-rent way, a cost including the transportation and inventory cost is formulized. After retailers are divided into two groups according to their demand rates and vehicle capacity, a mixed shipping strategy of direct and peddling shipping is adopted. A sliding-window based heuristic is presented to solve this problem using a VRP algorithm based on a hierarchical tree structure.

4 - Ameliorate Model on Transportation Problem

Vasumathi Arumugam, Sr.Lecturer, Vellore Institute of Technology, Vellore-14, Tamil Nadu, Tamil Nadu, 632 014, India, vaa72@yahoo.co.in, Dr. Dhanavanthan

This research paper in the area of transportation, has eliminated the pitfalls in VAM and MODI algorithms. An improvement in Degeneracy has also been developed by a new algorithm. The improvised version developed by repeated iteration has been tested in real time to give better results. KEYWORDS: Algorithm, Degeneracy, better result

■ WE21

H-Jade Suite 2

Selected Topics in Marketing

Contributed Session

Chair: Bart Larivière, Postdoctoral Researcher, Ghent University,
Hoveniersberg 24, Ghent, 9000, Belgium, bart.lariviere@ugent.be

1 - How UCP Pulls the Customers to Increase Sales? An Indepth Analysis

Rajesh Srivastava, Emeritus Professor, Simsr, 2/9/12, Blue Moon,
Bhawaninagar, Marol, Mumbai, 400059, India,
srivastava@vsnl.net

Abstract UCP by itself provides solutions to all the marketing problems poised by the widely accepted USP approach. Basically it aims at the core of the problem. It eliminates the problem from the roots rather than periodic trimming of the tree.

Keywords: UCP-Unique Customer Perception USP-Unique Selling Proposition

2 - Investigating the Lifecycle Event of "Moving in Together": Implications for Retail Banking

Bart Larivière, Postdoctoral Researcher, Ghent University,
Hoveniersberg 24, Ghent, 9000, Belgium, bart.lariviere@ugent.be,
Dirk Van den Poel

This study investigates the banking behaviour of youngsters once they move in together with their partner, and consequently face the need to acquire their first collectivized financial products, such as a joint account or a mortgage for their new home. The underlying goals of this study are (i) to explore whether youngsters are retention prone in the transition to this lifecycle event, as well as (ii) trying to understand the latter behaviour by exploring different potential drivers.

SESSION CHAIR INDEX

A

Abdinnour-Helm, Sue TA20
Aksin, Zeynep TB16
Alp, Osman SB06
Amar, A. D. WD02 WE02
Ammermann, Peter MD12
Anderson, Edward MA11
Anily, Shoshana WC13
Arumugam, Vasumathi WE20

B

Badawy, Michael K. WB12
Bae, Suk Joo SB01
Bai, Liwei MD01
Baugh, John WA20
Bayindir, Z. Pelin TD13
Bayiz, Murat MB15
Benjaafar, Saif TC06 WB06
Benneyan, James C. WB14
Bin, He TC20
Birbil, S. Ilker SC10
Bose, Indranil TA19
Brabazon, Philip WD04

C

Cai, Xiaoqiang MC09
Cao, Bingyuan SD02
Cao, De-Bi TB21
Cao, Zhi SC18
Caprihan, Rahul MD04
Carter, Franklin WE14
Chakraborty, Abhiram WD14
Chang, Hsihui WC02
Chang, Pei-Chann TB02
Chang, Shyr-Juh WC02
Chang, Woojin MB21
Chan, Philip SC02
Chan, Wing Hong TA21
Chan, Yupo MA03 TA18 TB18 TD18
Chao, Chen WD11
Chao, Xiuli MD05
Chari, Manoj MC07
Charnsethikul, Peerayuth TB09
Chaudhry, Mohan WD08
Chau, Patrick SC19
Chen, Chun-Ying SD18
Chen, Jian WC17
Chen, Xin SD10
Chen, Yong SA01
Chen, Zhi-Long TC09
Cheung, Yiu-ming MD19
Chiang, Chih-Ping WC09
Chiang, Chin-I WB15
Chien, Yu-Hung WB08
Chou, Mabel TA09
Chou, Shuo-Yan SB07
Chō, Vincent MA15
Chu, Ching-Wu SB18
Chu, Sydney TA12
Chu, Ta-Chung MA02
Chu, XueNing SA03
Chyu, Chih-Cheng TD15
Colombo, Richard WD21
Curry, Bruce TD20

D

Dang, Chuangyin MA10 TC10
de Matta, Renato MA17
Deng, Shi-Jie MB11
Disney, Stephen SC17
Dogru, Mustafa Kemal SC06
Dong, Lingxiu TA05
Dong, Meng TD16
Dormann, Julian WE15
Du, Timon TB19
Dutta, Goutam TB04

E

Esogbue, Augustine WC14

F

Fadiloglu, Murat WE13
Fang, Liping WE04
Fang, Shuhong MC21
Fan, Shu-Kai S. WB20
Feng, Cheng-Min WA12
Feng, Jack TC02
Feng, Jiejian WD13
Feng, Qianmei SD01
Feng, Youyi SD04
Fisher, Dorothy SC08 MC16
Fleischmann, Bernhard MB17
Flores, Idalia MB14
Fong, Bernard MD15
Fourer, Robert TC19
Fransoo, Jan MB06 MC06

G

Gan, Xianghua MA18
Ge, Rui WC10
Girinath, Rajini WE12
Gong, Linguo MB16
Guenther, Hans-Otto MC17
Gulledge, Thomas MB04
Gunes, Evrim Didem MD06

H

Ha, Albert TB05
Hagos, Luisto WD16
Han, Lee TA02
Helsen, Kristiaan TD03
He, Yuanjie MA13
He, Zhengwen WD03
Holder, Allen MC14
Hong, Jeff TB03
Horton, Jay SC11 SD11 WB07
Hou, Tung-Hsu (Tony) MB12
Huang, Chen-Mei SA19
Huang, George Q TD19
Huang, Joshua WC19
Huang, Ming-Hui MA19
Huang, Rongbing TB20
Huang, Xiao MD13
Hua, Zhongsheng WA02
Hu, Cheng-Feng MB02
Huh, Woonghee Tim SB05
Hung, Shin-Yuan MC19

I

Iyer, Ananth SA06

J

Jammerneegg, Werner MD17
Janakiraman, Ganesh SB05
Jeeananunta, Chawalit SB17
Jia, Jianmin MD08
Jiang, Yan WA10
Jinchuan, Cui WB10
Jin, Jihong TC07

K

Kanlayasiri, Kannachai TD11
Karaesmen, Fikri TA06
Karimi, I A WA09
Ke, Jyh-Bin WC08
Kellerer, Hans WD05
Keller, L. Robin MA08
Kelley, Tim (Carl) SA10 SB10
Kiang, Melody MD16
Kiatbanlue, Thanakorn WD01
Kim, Bowon MC20
Kim, Jihyun WA01
Klasterin, Ted WB21
Kleinmuntz, Don N. MB08
Kok, Gurhan MA05
Koukova, Nevena WA21
Kuno, Takahito MB20
Kusiak, Andrew TD04
Kwon, Soo Tae MA12
Kyparisis, George WB09

L

Lai, Kee-hung MB18
Lai, Ruei-Lung SA20
Lambrecht, Marc SD06
Larivière, Bart WE21
Latapie, Hugo WC12
Lee, Eva MC10
Lee, Ho Woo SC20
Lee, Hyun-Jung TA16
Lee, Lai-Soon WE05
Lee, Loo Hay TA03
Lee, Young MB03 WA07
Lei, Lei TC09
Lei, Ming MC11
Lertworasirikul, Saowanee MC02
Liang, Ting-Peng SD19
Lianto, Benny WE06
Li, Chung-Lun SA09
Lie, Ting TB12
Li, Kevin MC18
Lim, Gino J. MD14
Lim, Yun Fong SD07
Lin, Grace SC11 SD11
Lin, Ming-Yen WA19
Li, Rong TA01
Liu, Jianmin TB07
Liu, Jiyin TB10 TD10 WE09
Liu, Shuang MA16
Lo, Hing-Po SB19
Lo, Hong WA17 WB17
Luh, Hsing WA08

Lun Chung, Tzeng SA04
Lu, Roberto MC03 WC04
Lu, Yao WE08

M

MacCarthy, Bart WA04
MacGregor Smith, J. MA17
Madaan, Jitendra SB03
Ma, Dan TA07
Ma, Qin Hai WE04
Masuyama, Shigeru TC21
Matsuhisa, Takashi TC15
Matsui, Masayuki WD17
Matsui, Tomomi MD09
Mattfeld, Dirk C. WE18
Meng, Qiang TD17
Meyr, Herbert TA17
Michailidis, George SA02
Min, Jae Hyung TC16
Mirchandani, Prakash MB10
Miyashiro, Ryuhei MD09
Miyashita, Kazuo MC15
Mladenovic, Nenad WD20
Moki, Mieko WB16
Muñoz, David MD03

N

Nagarajan, Mahesh SC05
Nair, Vijay SB02
Nakai, Teruhisa SD08
Ng, Chi To MB09

O

O'Hanley, Jesse SD03
Ozcan, Yasar TD14
Ozer, Ozalp MC05 TC05
Özlen, Melih MA06

P

Pang, Sulin MD19
Papier, Felix SA18
Paul, Ranjan MA01
Piller, Frank WB04

Q

Qi, Xiangtong MA09

R

Raghunathan, Srinivasan WA03
Raj, S.P. WA16
Rana, Arif TC13
Rangaraj, Narayan SC03
Rauner, Marion TC14
Rhee, Hyeun-Suk WB03
Romeijn, Edwin WC06

S

Salle, Mathias WD15
Salo, Ahti TA08
Scaparra, Maria Paola WD18
Shan, Guangcun WE12

Sherman, H David WA14
 Sheu, Jiuh-Biing WC16
 Shi, Chunming MB13
 Shi, Leyuan TD09
 Shu, Lianjie MD01
 Siddiqui, Afzal TA11
 Sim, Melvyn SD10
 Sin, Raymond G. WC21
 Sirvanci, Mete SA08
 Son, Young Jun MA04
 So, Rick TB06
 Susic, Greys SC05
 Sounderpandian, Jayavel TC08
 Srite, Mark WD12
 Stecke, Kathryn E. MC04
 Su, Chuan-Jun WB19
 Sun, Peng SA05
 Sun, Shinn WB02
 Suzuki, Atsuo WA18
 Suzuki, Tsutomu WB18
 Swaminathan, Jay MC05

T

Takehara, Hitoshi MA20
 Tanaka, Keiichi SD21
 Tang, Guochun SC09
 Tang, Lixin TB10 TD10
 Tan, Joseph TA14 TB14
 Tan, Tarkan WA06
 Tao, Guoqiang WC07

Tempelmeier, Horst TB17
 Thomas, Lyn C. MD20
 Tirupati, Devanath WB13
 Tong, Frank WC19
 Tran, Vu WC12
 Tsang, Albert H.C. TC01
 Tseng, S. T. TD01
 Tsung, Fugee SC01 MC01
 Tunca, Tunay TD05
 Turkay, Metin TC03
 Tzeng, Guo-Hshiung TD02

U

Uncles, Mark TD03

V

Vandaele, Nico WD06
 Vaughn, Rayford WC03
 Verter, Vedat MA14 TC18
 Vilcassim, Naufel MB07
 Vining, Geoff MB01
 Vyt, Dany SB08

W

Wadhwa, Subhash TA15
 Wang, Eric MB19
 Wang, Fu-Kwun WC01
 Wang, Juite WA15

Wang, Kaibo TB01
 Wang, Shouyang TB08
 Wan, Guohua WD19
 Wang, Yi TD12
 Wang, Yuqiang (Billy) TB13
 Wan, Yat-wah TC17
 Wan, Zhongping WD09
 Wei, Ding TD07
 Weigel, Glenn TB11
 Weiss-Cohen, Miri TC12
 Wen, Fushuan TC11
 Wijayatunga, Priyantha WE01
 Wirth, Andrew SB09
 Wong, Hannah SB04
 Wu, Jie WA02
 Wu, Tai-Hsi WC20

X

Xiaodong, Jiang MA21
 Xu, Chunhui MD21
 Xu, Ningxiong SB20
 Xu, Susan TD06

Y

Yanasse, Horacio Hideki WC05
 Yang, Keng-Chieh SC07
 Yan, Jia MD18
 Yan, Jun SA01
 Yao, Andrew MC12

Yao, Ming-Jong MB05
 Ye, Hengqing SC04
 Yen, Benjamin SD09
 Yi, Gwangrim WB07
 Yoshise, Akiko MD10
 Yu, Changrui WC15
 Yu, Chian-Son MD02
 Yue, ChaoYuan SA17

Z

Zang, Wenan TA10
 Zhang, Dengfeng MC13
 Zhang, Fuqiang WB05
 Zhang, Qin TD21
 Zhang, Shuzhong WD10
 Zhang, Xiaolong WA13
 Zhang, Xinyan TB15
 Zheng, Shaohui WA05
 Zheng, Xiaona SD05
 Zhong, Jin MD11
 Zhu, Wanshan TA13
 Zipkin, Paul TC04
 Zwick, Rami MC08

A

Arcelus, F.J. TC16
 A.Samah, Azurah TD16
 Abdelrahim, Ahmed WA07
 Abdinnour-Helm, Sue TA20
 Abdul Majid, Hairudin WA01
 Abe, Keiji MA21
 Abe, Naoki WB07
 Achour, Heykel TD16
 Adhikari, Akshay SA02
 Agdeppa, Rhoda SB17
 Agrawal, Sunil MB03
 Agustin, Clara TD21
 Ahmad Khan, Ansar WD12
 Ahsan, M Kamrul TB21
 Aiemchareon, Saksiri SD02
 Ai, Wenbao WD10
 Akbarpour Shirazi, Mohsen TA13
 Akcali, Elif WC06
 Akcay, Yalcin MD06
 Akkan, Can WB10
 Aksen, Deniz TC18
 Aksin, Zeynep MD06, TB16
 Albizuri, M. J. SD08
 Albrecht, Amie SB09
 Aleman, Dionne WD14
 Alexander, Suraj WC01
 Alimi, Adel M. SD02
 Almeder, Christian MB10, WC20
 Alp, Osman SB06, TA06
 Alter, David MA14
 Altinel, Kuban SC10
 Altintas, Nihat MA05
 Álvarez, Armando MB14
 Aman, Koudai TC13
 Amar, A. D. WD02
 Amir, Madjid TC15
 Amiya, Akira WC09
 Ammermann, Peter MD12
 Anderson-Cook, Christine WA01
 Anderson, Edward MA11
 Andreas, Ernst SD03
 Anily, Shoshana WC13
 Aniseh, Mohammad TD15
 Anussornnitisarn, Pornthep TB09
 Aras, Necati TC18
 Archibald, Tom MD20, WE13
 Armstrong, Ronald WD09, WE01
 Arumugam, Vasumathi WE20
 Aryanezhad, Mir.B. SB04
 Asgari, Navid WC15
 Asgarkhani, Mehdi MA15
 Askin, Ronald G. MA04
 Asplin, Brent MA14
 Atali, Aykut MC05
 Audy, Jaromir TA16
 Awad, N. TB14
 Azizoglu, Meral MA06

B

Baatar, Davaatseren MC14
 Badawy, Michael K. MA15, WB12
 Bae, Suk Joo SB01
 Bagchi, Uttaran TD13

Baig, Mirza WD12
 Bai, Xue SA04
 Bajpai, Gaurav WA20
 Bakr, Mamdouh M. TA18
 Balaji, Kannan TB13, TB16
 Balakrishnan, Anant MB10, TD06
 Balakrishnan, Jaydeep SD07
 Balaubramanian, Sivakumar WD13
 Banal Estanol, Albert MB11
 Banciu, Mihai MB10
 Bansal, Mukta WA09
 Bar-Gera, Hillel WB17
 Bartholdi, III, John SD07
 Basant, Rakesh MA15
 Bashiri, Mahdi WD01
 Bassok, Yehuda SC05
 Basu, Amiya TD03
 Batislam, Emine MD06
 Baugh, John WA20, WC20
 Bayindir, Z. Pelin TD13
 Bayiz, Murat MB15
 Beecher, Margo MD16
 Behrens, Doris TC14
 Bekrar, Abdelghani WD05
 Benjaafar, Saif TA06, TB05, TC06
 Bennell, Julia A. WE05
 Bennayan, James C. WA14, WB14
 Berk, Emre WD13
 Berman, Oded TB20, TC18, WD18
 Berninghaus, Siegfried TC15
 Bernstein, Fernando SD05 MA05,
 Bhamidipati, Sriram WE02
 Bhatnagar, Rohit SD18
 Bhutta, Khurram TC13
 Bian, Wen TD16
 Bibhushan WB09
 Bick, Michael TB17
 Bidanda, Bopaya TC13
 Bilgin, Selin MA06
 Bin, He TC20
 Birbil, S. Ilker SC10, WE06
 Black, Daniel WE13
 Boland, Natasha MC14
 Boonmung, Suwanee TD11
 Bortfeldt, Andreas WC05
 Borzi, Alfio SA10
 Bose, Indranil TA19
 Bouhmala, Noureddine WB20
 Boute, Robert SD06
 Boyabatli, Onur TA05
 Bozkaya, Burcin WB10
 Brabazon, Philip WA04
 Brachinger, Hans Wolfgang TC20
 Broekmeulen, Rob MB06, MC06
 Brown, Marvin L. TD20
 Bruno, Hernan MB07
 Bryan A. Chua, Geoffrey WB06
 Bunn, Derek TA11
 Burez, Jonathan TB07
 Burrows, Glen R. TB18, TD18
 Butler, T. TB14
 Bu, Xian-jin WD11
 Byun, Hyunsoo TB12

C

Cai, Jian SD05
 Cai, Pei-Jyun TC17
 Cai, Xiaoqiang SC09, MC09, WC17
 Cakan, Nesrin TB16
 Cakanyildirim, Metin MA18
 Cakir, Birgul WD01
 Caliskan, Fethullah SA04
 Camerer, Colin MC08
 Cao, Bingyuan MB20
 Cao, De-Bi TB21
 Cao, Rongzeng TD07, WC09
 Cao, Zhi SC18
 Caprihan, Rahul MC04, MD04
 Cargille, Brian SA20
 Carikci, Baris WD01
 Carlson, John G. MC12
 Carter, Franklin WE14
 Carter, Michael SB04
 Castillo, Ignacio MA13
 Cauley, Fattaneh WB10
 Caulkins, Jonathan TC14
 Chakraborty, Abhiram WD14
 Chakravarthy, Srinivas WD08
 Chandra, Pankaj MA15, WB13
 Chan, Edna WC20
 Chang, Chia-Ming MC19
 Chang, Chia-Ting TA21
 Chang, Hsin-Yuan TB16
 Chang, Hyeong-Soo MC20
 Chang, Ju-Ming WB20
 Chang, Kai-Hsiang TB01
 Chang, Kai-Ming TA21
 Chang, Kuo-Hwa WA08
 Chang, Pei-Chann TB02, TD02
 Chang, Shyr-Juh WC02
 Chang, Tsung-Sheng WC09
 Chang, Woonjin MB21
 Chang, Ya-Ting MC21
 Chang, Youngho TA11
 Chang, Yu-Chi TD01
 Chang, Yung Chiang WB02
 Chang, Yu-Ting TC20
 Chan, Pui Yuk, Simon MB18
 Chan, Wing Hong TA21
 Chao, Chen WD11
 Chao, Paul WC21
 Chao, Xiuli WA05, WA09
 Chari, Manoj MC07
 Charnsethikul, Peerayuth TB09
 Chattopadhyay, Debabrata TC11
 Chaudhry, Mohan WD08
 Chau, Michael SD09, TA19
 Chau, Patrick SC19, WB12
 Chellappa, Ramnath K. WC21
 Chen, Chia-Hung WD09
 Chen, Chien-Yin WB04, WB20
 Chen, Chun-Der TD12
 Chen, Chung-Ho MA02
 Chen, Chun-Ying SD18
 Chen, Dipeng TA11
 Chen, Feng SC05, SC09
 Chen, Frank SB05, SC17, TD06
 Cheng, Angela TC04
 Cheng, Chun Hung SD07
 Cheng, Feng SD04, MB03
 Cheng, Hilary WE02
 Cheng-Hsiung, Chen SA19
 Cheng, Jin SD18
 Cheng, Juey-Fu WE09
 Cheng, Ming-Shun TC20
 Cheng, T.C. Edwin SA09, MB18, WB09
 Cheng, Tai Chiu Edwin MA09
 Cheng, Tsang-Hsiang TB14
 Cheng, Vivying TA14
 Cheng, Yuyen MA01
 Chen, Hong WA05
 Chen, Huifen MA01
 Chen, Hui-Ju SC10
 Chen, Jian SC09, MC09, TB08, WC17
 Chen, Jih-An WB08
 Chen, Kay-Yut TC05
 Chen, Liuxin MB13
 Chen, Li-Wen SB17
 Chen, Mao-Fu WA19
 Chen, Mingzhe SA17
 Chen, Pony SA03
 Chen, Qiyang MD12
 Chen, Rong (Rachel) WB05
 Chen, Sih-Hong MB12
 Chen, Songlin WC04
 Chen, Tsiushuang MC09
 Chen, Wen Chwan MA02
 Chen, Wenqing SD10
 Chen, Xi TA19
 Chen, Xiangfen WA10
 Chen, Xiaorong TA15
 Chen, Xin SD10
 Chen, Xujin TA10
 Chen, Ye WB13
 Chen, Yen-Heng TD16
 Chen, Ye-Sho SC07
 Chen, Yi-Chih WA08
 Chen, Yi-Kang WB02
 Chen, Yi-Lin MC02
 Chen, Yong SA01, TA01
 Chen, Yuxin MB07
 Chen, Zhi-Long TC09
 Chen, Zhong TA15
 Cheong, Michelle SD18
 Cheong, Ngai WC10
 Cheung, Bernard K. S. WD15
 Cheung, Ki Ling MD05, TB13
 Cheung, Raymond TC17
 Cheung, William WC19
 Chevalier, Philippe WD06
 Chew, Ek Peng TA03
 Chhajed, Dilip MB15, TC07
 Chia-Hung, Wang WA08
 Chiang, Chih-Ping WC09
 Chiang, Chin-I WB15
 Chiang, Yu-Min SA04, MB12
 Chien, Yu-Hung WB08
 Chih, Mingchang SA03
 Chilingierian, Jon TD14, WA14
 Chilong, Mao WD11
 Chin, K.S. TC01
 Chiou, Juing-Shian MC20
 Chiou, Yu-Chiun MC02, WA17
 Chi, Robert MD12, TA16
 Chiu, Chih-Chou TC11
 Chiu, Wenchi SB03, TA03

Chod, Jiri TA05
 Choi, Changwoo MD15
 Choi, Jeewon SB03
 Choi, Jiyoung SB03
 Choi, S.Chan WA21
 Choi, T.M. Jason MA18
 Chomtee, Boonorm TD11
 Chong, Juin-Kuan MC08
 Chong, Ping Pete SC07
 Chopra, Sunil TB13
 Chopra, Sunil WD18
 Cho, Richard SA06
 Cho, Sung Ku SB19
 Chou, Charles TB19
 Chou, Fuh-Der TB02
 Chou, Huey-Wen MB19, MC16
 Chou, Mabel TA09, WB06
 Chou, Shih-Hao WE13
 Chou, Shu-Jung WA19
 Chou, Shuo-Yan SB07, TA21, TB01, WE13
 Chou, Ying Yu WB02
 Cho, Vincent MA15
 Cho, Yuh-Jen MB03
 Chris, Clifton SA06
 Chua, Chek Beng MD10
 Chuang, Chun-Ling TD15, WA10
 Chuang, Sheng-Yuan MD02
 Chu, Chengbin WD05
 Chu, Ching-Wu SB18
 Chu, Hsuan-Wei MB19
 Chung, C.Y. TC11
 Chung, William SB17
 Church, Richard WD18
 Chu, Sydney TA12
 Chu, Ta-Chung MC02
 Chu, XueNing SA03
 Chu, Yunn-Kuang WB08
 Cleanthous, Paris TD03
 Colombo, Richard WD21
 Colwill, Richard D. MC18
 Connors, Daniel WA07
 Cortazar, Gonzalo MB21
 Counte, Michael A. WB14, WC14
 Cruz, Dennis SA18
 Cruz, Frederico MA17
 Cuccia, Luigi SA20
 Cui, Wuanan TD07
 Curry, Bruce TD20

D

Dai, Wanyang SC04
 Dai, Yu-Hong WD20
 Damrongwongsiri, Montri MB16
 Dang, Chuangyin MA10
 D'Ariano, Andrea SC03
 Das, Ankur MC04
 Daskin, Mark WD18
 David, Kumar MA11
 Davidson, Rachel SB20
 de Kok, Ton SC06, SD06
 de Matta, Renato MA17, MC13
 De Souza, Robert TB16
 Dearden, James WE14
 Dekker, Rommert SC06
 Delasay Sorkhab, Mohammad WA15
 Dempe, Stephan MB20

Dempsey, James WD14
 Denby, Lorraine SA02
 Deng, Geng TA03
 Deng, Shi-Jie MB11
 Deng, Xiaotie TA10
 Denizel, Meltem MD06
 Desai, Chetan WA09
 Desaulniers, Guy TD16
 Deshpande, Vinayak TC06
 Detemple, Jerome SD21
 Deubzer, Frank WA16
 Devasahayam, Paul Manuel WD13
 Dewhirst, Timothy TC07
 Dexter, Franklin TD14
 Deyong, Huang WD16
 Dhanavanthan, Dr. WE20
 Dhillon, Gurpreet WB03
 Ding, G. TA10
 Ding, Haili TC10
 Ding, Jihuan MC09
 Ding, Qing MA09
 Disney, Stephen SB05, SC17, SD06
 Dodo, Atsuhiro SB20
 Doerner, Karl WC20
 Dogru, Mustafa Kemal SC06
 Dong, Heng TD20
 Dong, Jin MB03
 Dong, June WA13
 Dong, Lingxiu TA05
 Dong, Meng TD16
 Donner, Patrick MC18
 Dormann, Julian WE15
 Douglas, Craig SA10
 Dror, Shuki MA01
 Duan, Wenqi TA15
 Dumrongpokaphan, Thongchai WE14
 Dunstall, Simon SB09, TA15
 Du, Timon Chih-Ting TB19
 Dutta, Goutam TB04

E

Eck, Brian Thomas TB16
 Eck, Brian MB03
 Ee, Mong Shan MD20
 Ehrgott, Matthias MC14
 Ehrmann, Thomas MC03, WE15
 Eisenstein, Donald SD07
 Ekiz, Erdogan MD12
 Elahi, Ehsan TB05
 Elhafsi, Mohsen TC06
 Elizondo, Mayra MB14
 Ellis, D. TB14
 Erdem, Asli Sencer WE12
 Erhun, Feryal MA05
 Erkip, Nesim MC05
 Ertek, Gurdal WE18
 Esogbue, Augustine MC13, WC14
 Euajongmanee, Arnut MB16
 Eyadat, Mohammad MC16
 Ezawa, Kazuo MA08

F

Fabozzi, Frank MD21
 Fadiloglu, Murat WE13
 Fang, Jeng-Jung MA02
 Fang, Kuan-Chieh WA12
 Fang, Liping WE04
 Fang, Shu-Cherng SC10
 Fang, Shuhong MC21
 Fang, Xiang TB05
 Fang, Youkang WB10
 Fan, Shu-Kai S. WB20
 Fanslau, Tobias WC05
 Fan, Yi-Wen SA19, TD12
 Fan, Yujin MA01
 Fehr, Helga SC08
 Fei, Xiang MD15
 Feng, Cheng-Min WA12
 Feng, Jack TC02
 Feng, Jiejian WD13
 Feng, Qianmei SD01
 Feng, Tianjun MA08, TB06, WB05
 Feng, Xiaoming MD11
 Feng, Youyi SA05, SD04, MB13, MC13
 Ferguson, Michael MC08
 Ferrer, Alberto SB02
 Ferris, Michael TA03
 Feyzioglu, Orhan SC10
 Fiala, Petr TC15
 Fichtinger, Johannes MD17
 Filiztekin, Alpay MD06
 Fisher, Dorothy SC08, MC16, MD12, MD16, TA16
 Fisher, Marshall MC06
 Fisher, Steven SC08, MD12, TA16
 Fleischmann, Bernhard MB17
 Flores, Idalia MB14
 Florian, Michael WB17
 Flottemesch, Thom MA14
 Floudas, Christodoulos A. MD14, TC03
 Fong, Bernard MD15
 Fourer, Robert TC19
 Fransoo, Jan MB06, MC06
 Froyland, Gary WC16
 Fu, Chang-Jui MA16
 Fujikawa, Hiroaki WD17
 Fujiwara, Nobutomo MD09
 Fukushima, Masao SB17, MD21
 Fukushima, Masao WC20
 Fuller, J. David SB17
 Fu, Michael TB03
 Fu, Michael MC20
 Fung, Ho Ki MD14
 Fu, Qi SB05, WA09
 Furmans, Kai TB17
 Furuta, Takehiro WA18
 Furuyama, Shigehito SD08

G

Gaalman, G. SB05, SC17
 Gai, Ling SC09
 Gamache, Michel TD16
 Ganesh, N. S. Gowri TC12
 Gan, Xianghua MA18

Gao, Chengxiu TC10
 Gao, Chongyan MD08
 Gao, Haibing TC02
 Gao, Liang TC02
 Gao, Rongxing MD21
 Gao, Su WD09
 Garcia-Flores, Rodolfo TA15
 Garg, Nitin SB18
 Gassenferth, Walter MB08
 Gaur, Vishal MC06
 Gautam, Rajesh MC15
 Gavireni, Srinagesh WB06
 Gedikoglu, Burak WE12
 Geiger, Martin Josef WB15
 Gel, Esmat S. MC05
 Gerchak, Yigal TA06, WB06
 Gershwin, Stanley B. MC04
 Ge, Rui WC10
 Gesslbauer, Joerg TC14
 Ge, Zihui SA02
 Gifford, Ted SC03
 Gilbert, Stephen TC13
 Giles, David MD16
 Giloni, Avi MD20
 Gimpl-Heersink, Lisa MD17
 Girinath, Rajini WE12
 Gittins, John WA16
 Glazebrook, Kevin WE13
 Glickman, Theodore WC03
 Glinz, Irma MB14
 Glockner, Gregory TC19
 Glowacka, Karolina MB10
 Godinho, Teresa TB20
 Goh, Mark TB16
 Goi, Chai Lee WA12
 Gokhale, Ravindra SC03
 Golden, Bruce MB10
 Goldsman, David SB03, TA03
 Gonçalves, José Fernando WC05
 Gong, Linguo MB16
 Gonzalez-Farias, Graciela SB02
 Goossens, Nico WD06
 Gordon, Brad MA14
 Gordon, Linda TC13
 Gouveia, Luis TB20
 Goyal, Suresh WC13
 Gozun, Brian SC03
 Graves, Stephen SD18
 Greenberg, Albert SA02
 Grunow, Martin MC17
 Guangzhong, Liu TB15
 Guenther, Hans-Otto MC17
 Guerra Duarte Neto, João MB08
 Guiffrida, Alfred TD13
 Gullede, Thomas MB04
 Gullu, Refik SB06
 Gulsac, Tamer TD13
 Gunaseelan, Arivarignan WD13
 Gunawan, Aldy WA10
 Gunes, Evrim Didem MA14, MD06
 Guo, Fuhua MD19
 Guo, Shien WB14
 Guo, Wei WC04
 Guo, Yongjiang SC04
 Gupta, Reetika WE12
 Gu, Qiaolun TC04
 Gurkan, Gul SC10
 Gurler, Ulku WA13
 Gursoy, Kemal TB20

Guttman, Astrid MA14
Guven, Caglar TB15

H

Ha, Albert TB05, TC05
Habib Sheikh, Kashif WC03
Habla, Christoph MC17
Hadjiconstantinou, Eleni SC18
Haghdoost, Shadi MA21
Hagos, Luisto WD16
Hahn, Soo Jin WE02
Haiping, Zhu WA15
Haiyan, Fan WC01
Haksoz, Cagri MB13
Halati, Abolhassan MA13
Hall, Nicholas G. SD09
Hamacher, Horst MC14
Hämäläinen, Raimo P. TC08
Hamdani, Tarek M. SD02
Han, Deren SB10
Han, Deren TD17
Han, Lee TA02, TB02, WD16
Han, Yi WE20
Hao-Guang, Chen MC20
Harmantzis, Fotios WE06
Hartl, Richard F. MB10, WC20
Hassamont, Jaramporn MC12
Hassin, Refael WC13
Hauber, Wolfgang TB10
Hawkins, Robert WA04
Hayya, Jack TD13
He, Bingsheng TD17
Hedar, Abdel-Rahman WC20
Heese, Sebastian MC05
He, Huifen SD04
Helander, Martin WC04
Helo, Petri WB04
Heo, Kyoung Won SB19
He, Qi-Ming WA05, WD08
Heragu, Sunderesh MA04
Herbon, Avi WE08
Herings, P. Jean-Jacques MA10
He, Xiaozheng MD18
He, Yangfan WD12
He, Yanqun WD21
He, Yuanjie MA13
He, Zhen WD04
He, Zhengwen WD03
He, Zhuqing WE18
Hibiki, Norio MA20
Hinojosa, Miguel Angel SD08
Hipel, Keith W. WB13
Hoberg, Kai MD13
Holder, Allen MC14
Hong, Jeff TB03
Honglan, Yang WD20
Hong, Yau-Loong WA10
Horton, Jay SC11, SD11, WB07
Ho, Shu-Chun SD19
Hosoda, Taka SD06
Ho, Teck H. MC08, WA21
Hou, Fujun SD08
Hou, John WE18
Hou, Tung-Hsu (Tony) MB12
Ho, Zih-Ping MB16
Hsiao, Hsing-Chin WC02
Hsieh, Jih-Chang TB02
Hsieh, Shuhuei SC02
Hsu, Chia-Yun MB03

Hsueh, Sue-Chen WA19
Hsu, No-Jen MB12
Hsu, Ping-Yu SA19
Hsu, Rong-Long MC16
Hsu, Shang Hwa MB15
Hsu, Vernon MA17
Huang, Cheng-Wei SD19
Huang, Chen-Mei SA19
Huang, Chian-Chen TA12
Huang, Chien-Hung MA16
Huang, Chih-Hui MC16
Huang, Chikong WC16
Huang, Dashan MD21
Huang, George Q. WC19
Huang, Hai-Jun TD17
Huang, Hai-Sheng MA19
Huang, Jau-Ling MC19
Huang, Jia-Yen TA09
Huang, Kai-Bin WA08
Huang, Li-Hua WC02
Huang, Min SA18
Huang, Ming-Hui MA19
Huang, Peng Li WB02
Huang, Rongbing TB20
Huang, Shoue-Yu TB16
Huang, Stephanie TD03
Huang, Suzhou TC05
Huang, Xiao MD13
Huang, Youqun WE05
Huang, Yu-Kai WA12
Hua, Zhongsheng WA02, WC01
Hu, Chia-Jung TC12
Huebner, Reinhard MC17
Hu, Guiping TC13
Huh, Sung-kyoo SD21
Hu, Hui MB13
Huixia, lv TB20
Hui, Y V TB18, TD18
Hu, Jean TC07
Hu, Jiaqiao TB03
Hu, Michael TB07
Hung, Hunphry MA15
Hung, Ming TB07
Hung, Pai-Hsien SB17
Hung, Patrick TA14
Hung, Yung-Yao MB02
Hu, Paul MB19, TA12, TB14
Hussin, Burairah SC02
Hu, Ta-Yin SB17
Hu, X. TA10
Hu, Xinmin MA11
Hu, Yichao MC11
Hu, Yi-Qing WD20
Hwang, Gang Uk SA08
Hwang, Hark-Chin WE08
Hwang, Heung Suk MD03
Hwang, Ji-Bin MC12
Hwang, Jing-Jang WD02
Hwang, Juhwen MA13, WC13
Hwang, Jung Yoon SB01
Hwang, Shin-Ying TC11

I

Ibaraki, Toshihide TC21
Iijima, Junichi SD19
Ikenoue, Susumu WB16
Ikonnikova, Svetlana SB07
Ikuta, Seizo MD20
Imahori, Shinji MD09, TC21,

WE05
Imamichi, Takashi TC21
Inaguma, Toshikazu MB21
Inakawa, Keisuke WA18
Ishii, Daisuke MA20
Ishii, Toshimasa TC21
Ishino, Fukuya TC13
Ishizaki, Fumio WA18
Isogai, Akifumi MA20
Ispahani, Ahmed TC13
Iwersen, Jørgen MB01
Iyer, Ananth SA06, SD05

J

Jain, Apurva TC06
Jain, Hemant WD12
Jain, Nimit WB13
Jaisakthi, S.M. TC12
Jalali Manesh, Yaser SB04
Jalil, Sakib SB17
Jammerneegg, Werner MD17
Jang, Young Jae MC04
Jaroz, P. TB14
Jaruphongs, Wikrom TA09
Jeenanunta, Chawalit SB17
Jen-Chih, Yao MA02
Jeng, Shuen-Lin TD01
Jeong, Miock SA08
Jeon, Hye Jin MC21
Jiafu, Tang WA20
Jia, Jianmin MD08, TB08, WB12
Jia, Jing MA04
Jiandong, Li MB09
Jiang, James J. MB19
Jiang, Ming WA13
Jiang, Wei SA06, MD01
Jiang, Yun SA09, WE09
Jiang, Yunfei MC03
Jiao, Jianxin (Roger) TC02, TD04, WB04, WC04, WE04
Jia, Tao WD03
Jie, Li MC11
Jie-shuang, Dong TB15
Jifeng, Xing WD16
Ji, Jianhua TC04
Jinchuan, Cui WB10
Jindahra, Pavitra WD21
Jing, Cao TB15
Jing, Fan MA21
Jin, Judy SD01
Jin, Ming TB01
Ji, Ping TC10
Johnsen, Erik WE15
Johnson, Ellis MC10
Johnson, Johnnie SC08
Johnson, Michael TA14
Johnston, Robert MC14
Jolai, Fariborz WA15
Jones, Dylan WB15
Jones, Nancy MA08
Jung, MeeSook TA16
Jun, Gong WA20

K

K.Misra, Arun WD12
Kabiling, Wilfrido SA18
Kacem, Imed WD05
Kaino, Osamu TC20

Kainuma, Yasutaka TD13
Kakefuda, Satomi WD17
Kalashnikov, Vyacheslav MB20
Kalashnykova, Nataliya MB20
Kalinowski, Thomas MC14
Kamyat, Chatpun TB09
Kang, Chang Wook SB01
Kang, Seok Chan MB16
Kang, Sungmin MB17
Kang, yong ha MB16
Kanlayasiri, Kannachai TD11
Kannan, PK WA21
Kannegiesser, Matthias MC17
Kanoh, Satoru MA20
Kantarciovglu, Murat SA06
Kapur, Kailash SD01
Kapuscinski, Roman TA13
Karaesmen, Fikri TA06, TB16, WA06
Karakayali, Ibrahim WC06
Karimi, I A TA09, TC03, WA09
Kasap, Deniz SB07
Katayama, Naoto SA17
Katsurayama, Yasunori MA21
Kavlak, Nursel WE06
Kawaguchi, Muneki MA20
Kawai, Hidetaka WA18
Kaya, Murat TC05
Kazemzadeh, Reza WD01
Keech, Malcolm WE05
Ke, Jau-Chuan WB08
Ke, Jyh-Bin WC08
Kellerer, Hans MB09, WD05
Keller, L. Robin MA08
Kelley, Tim (Carl) SA10
Keng, Ching-Jui TA12
Kerbache, Laoucine WD06
Kessel, Lowell MA08
Kettunen, Janne TA08
Khalid, Halimahtun WC04
Khammunag, Kwanniti SB09
Khan Pathan, Mahmood TD20
Khan, Najeed Ahmed WC12
Khan, Najeed TC20
Khansa, Lara WA03
Khongsawat, Paradon MC03
Kiang, Melody SC08, MD12, MD16, TA16
Kiatbanlue, Thanakorn WD01
Kien Ming, Ng WA10
Kijima, Masaaki SD21
Kilger, Christoph TB17
Kilgour, D. Marc WB13
Kilic, Kemal SC10
Kim Leng, Poh WA10
Kim, Bowon MC20
Kim, Chaiho SB20
Kim, Cheong-Tag WB03
Kim, Chulhyun MD15
Kim, Hong Sik MA21
Kim, Il-woon SD21
Kim, Jihyun WA01
Kim, Jinhwa TB12
Kim, Jong Moo SB08
Kim, Jong-Wook TB11
Kim, Kilsun MB15
Kim, Kwang-Jae MC01
Kim, Kwangsoo WB10
Kim, Nam Ki WD08
Kim, Sang Ahn SC20

- Kim, Seong Joon SB01
 Kim, Seongmoon WE14
 Kim, Seungkyum MD15
 Kim, Sung-Shick MB16, MC12, WA01
 Kim, Wan Seok TD16
 Kim, Wonjoon TD03
 Kim, Yeong WB18
 Kim, Yoonseong MD15
 King, Irwin Kuo-Chin TB19
 Kirby, Maurice WB21
 Kirchmer, Mathias MB04
 Kirkwood, Craig MA08
 Kischka, Peter MD17
 Kisialiou, Mikilai WD10
 Klastorin, Ted WB21
 Kleinmuntz, Don N. MB08
 Kocas, Cenk WA21
 Koch, Thorsten WC16
 Koermer, Tamara SB04
 Kohn, Wolf TD19
 Ko, Hoyo-Heon MC12
 Kojima, Masakazu MD10
 Koji, Nonobe TC21
 Kok, Gurhan MA05
 Köksalan, Murat SB06, WB15
 Komoribayashi, Katsuya MA20
 Kong, Nan TC14
 Konno, Hiroshi MA20
 Kontoleon, Nectarios TA15
 Kotak, Akshay WC14
 Koukova, Nevena WA21
 Koulamas, Christos WB09
 Kouvelis, Panos TA05
 Kowalski, Scott MB01
 Kozan, Erhan SB09, SC18
 Krappinger, Reinhard TD10
 Krass, Dmitry WD18
 Kraus, Markus TC14
 Kremers, Hans MA10
 Krishnamoorthy, Mohan SD03
 Krishnan, Jayanth MC06
 Kristjansson, Bjarni TC19
 Kubo, Mikio SA17
 Kubota, Keiichi MA20
 Kubzin, Mikhail A. MB09
 Kucuk Inel, Bilge WE18
 Kucukusta, Deniz MD12, WD01
 Kumar, Arun TD04, WD04
 Kumar, Ashok MD04
 Kung, David TC13
 Kung, Dr. Mabel SA20
 Kuno, Takahito MB20
 Kuo, Ching-Chang WC08
 Kuo, R. J. TD02
 Kuo, Way SB01, SC01
 Kuo, Yi-Hua MB02
 Kushiya, Motoki WE05
 Kusiak, Andrew TD04
 Kvam, Paul SB01
 Kwok, Aaron W.K. TC01
 Kwok, Simon TD03
 Kym, Hyo-Gun TA16, WE02
 Kyparisis, George WB09
- L**
- La Commare, U. SA20
 Lai, Kee-hung MB18
 Lai, Ruei-Lung SA20
 Lakshminarayanan, Samavedham TC03
 Lambrecht, Marc SC17, SD06
 Lam, William WB17
 Lan, Lawrence W. WA17
 Larivière, Bart WE21
 Larsen, Christian WE13
 Latapie, Hugo WB16, WC12
 Laupacis, Andreas MA14
 Lavery, John SC10
 Law, Gil TC17
 Lawrence, Earl SA02
 Le Moing, Monique SB08
 Lecluyse, Christophe WD06
 Lee, Allen TC17
 Lee, Bae Jin SB01
 Lee, Cheng-Yo MB12
 Lee, Ching Chyi MC08
 Lee, Ching-Chang MC19
 Lee, Chin-Ling MC16, MD16
 Lee, Chung-Hong WA19
 Lee, Chung-Yee SB05, TC06, WA09
 Lee, Der-Horng SC18, TD16
 Lee, Dong-Yup TC03
 Lee, Eui Yong SA08
 Lee, Eva MC10, MD14
 Lee, Feng-Liang MB15
 Lee, Hau MC05
 Lee, Ho Woo SC20
 Lee, Hwi Young MC13
 Lee, Hyun-Jung TA16
 Lee, Jae Kang WC07
 Lee, Jiyeon WE08
 Lee, Johnny TA12
 Lee, Kibaek TD16
 Lee, Lai-Soon WE05
 Lee, Loo Hay TA03
 Lee, Man Sik SB01
 Lee, Min Woo MD12
 Lee, Patrick SA03
 Lee, Pi-Tsan WB19
 Lee, S.C. TB18
 Lee, Sam TB19
 Lee, Se Won SC20
 Lee, Seong-Kon TB11
 Lee, Seunghoon SB03, TB12
 Lee, So-Hee WB18
 Lee, Ssu-Lang WB08
 Lee, Suk SB03
 Lee, Taehan SB03
 Lee, ThaeMin TB12
 Lee, Tzu-Hsien MA02
 Lee, WB MA12
 Lee, Wen-Chiung WC08
 Lee, Wu-Hsuang TA12
 Lee, Young MB03, WA07
 Lee, Yueh-Chiang MD08, WA12
 Lee, Yusin WE09
 Leibfritz, Friedemann SB10
 Lei, Lei TC09, WD09
 Lei, Ming MC11
 Le, Meilong MC18
 Leng, Mingming TB13
 Leowski, Chris TD12
- Lertworasirikul, Saowanee SD02
 Leung, Lawrence C SD03, TB18
 Leung, Pingsun WE09
 Leung, Stephen C. H. TB18
 Leung, Steve WB19
 Leung, Ying Tat MB03
 Levin, Tanya TB04
 Levin, Yuri TB04
 Levy, Elliot TD15
 Liang, Liang WA02
 Liang, Ting-Peng SC19, SD19
 Liang, Zhe TA09
 Lian, Haijia TC04
 Lianto, Benny WE06
 Liao, Chung-Shun MA19
 Liao, T Warren TD02
 Liao, Tsai-Yun WA19
 Liao, Yuan MD11
 Liao, Ziqi WA16, WB07
 Liaw, Chih Yi TC11
 Li, Chung-Lun SA09, TC09
 Li, Devin WE09
 Liesiö, Juuso TA08
 Lie, Ting TB12
 Li, Feng TB19
 Li, Frank WD04
 Li, Gang TD06
 Liginlal, Divakaran WA03
 Li, Han-Lin MA16, MD02
 Li, Hao WA10
 Li, Hui WD08
 Li, Jan-Mou TA02, WD16
 Li, Jeng-Han TC12
 Li, Jianfeng WE20
 Li, Jingwen WA10
 Li, Kevin K.X. SD18
 Li, Kevin W. WB13
 Li, Ling TB16
 Li, Lode WA05
 Lim, Ching Moi TD04
 Lim, Gino J. MD14
 Li-Min, Chang MC19
 Lim, Jae Min TD16
 Lim, Kyung Eun SA08
 Lim, Michael WD18
 Lim, Yun Fong SD07
 Lin, Bin WC02
 Lin, Cheng-Jian MC16, MD16
 Lin, Chien-Hua Mike TD20
 Lin, Chih-Hao TC12
 Lin, Chin-Kang WC09
 Lin, Chun-Hao WA12
 Lindemann, Udo TD04, WA16
 Lin, Grace SC11, SD11, WB14
 Lin, Jenyen SC10
 Lin, Jun MB15
 Lin, Lin TA12, TB14
 Lin, Ming-Yen WA19
 Lin, Oscar WB19
 Lin, Rong-Ho TD15, WA10
 Lin, Shih-Wei SB18
 Lin, Shu-Ling MC21
 Lin, Yichen MC02
 Lin, Yu-Jing TA21
 Lin, Yung-Hsiang WC16
 Lin, Yu-Tzu MA19
 Lin, Zhong TB21
- Lin, Zi-Po MB02
 Liou, Cheng-Hwai WC08
 Liou, Yeong-Cheng MA02
 Li, Qing TC05, WA05
 Li, Rong TA01
 Liu, B. MA16
 Liu, Cheng-Lian MD16
 Liu, Guangzhong TB15, WD16, WE08
 Liu, Guoguang MA09
 Liu, Hao-Tien MB02
 Liu, Henry MD18
 Liu, Jiamin WE05
 Liu, Jiyan SA09, TB10, TC17, WE09
 Liu, Jiying SD01
 Liu, Ke MD15
 Liu, Liming WD13
 Liu, Mingxin WD03
 Liu, Shan-Min WC02
 Liu, Shuang MA16, WA01
 Liu, Shuang SC08
 Liu, Shu-Chu WB20
 Liu, Xinbao WA02
 Liu, Yunhui WC17
 Liu, Zhidong SC08
 Liu, Ziyang WD03
 Li, Vincent TA20
 Li, Weiqi WA13
 Li, X. SB10
 Li, Xiuhui MA13
 Li, Xun MD05
 Li, Yanting TB01
 Li, Yiwen WD12
 Li, Yongjian SC09
 Li, Zhaolin MD13, TD06
 Li, Zhekun MA01
 Li, Zhigang MD18
 Lliu, Jau-Yang SA19
 Lo Ching Wing, Bryan WB21
 Lo, Chris MB18
 Lo, Hing-Po SB19, TD18, WD21
 Loh, Kok-Hua MB10
 Lo, Hong WA17
 Low, Chinyao WB09
 Luan, Jackie Y. MB07
 Luh, Hsing WA08
 Lu, I-Li MA01
 Lu, Kun-Lin WA19
 Lun Chung, Tzeng SA04
 Lun, Venus MB18
 Luo, Jiaxiang TD10
 Luo, Li MC13
 Luo, Zhi-Quan WD10
 Luo, Zongwei WC19
 Lu, Roberto WB04
 Luscombe, Ruth WD11
 Lu, Xiaofeng WD03
 Lu, Xiaoling WD21
 Lu, Yao WE08
 Lu, Yi TC05
 Lu, Yi-Chuan WE02
 Luzon, Amos WB17
 Lv, Yibing SC07

M

MacCarthy, Bart WA04
 MacGregor Smith, J. MA17
 Macq, Jean Francois WD06
 Madaan, Jitendra SA20, SB03
 Madadi, Alireza TA13
 Ma, Dan TA07
 Magnanti, Tom TB20
 Ma, Guangkun WE05
 Maharshak, Arie TA07
 Maheshwary, Siddhartha MC10
 Mahut, Michael WB17
 Mai, Bin WA03
 Mak, Ho-Yin WC06
 Ma, Li-Ching MD02
 Malik, Shahid TB15
 Ma, Liping SA18
 Ma, Nang SC18
 Mandel, David R. TC08
 Maniar, Hiren MC21
 Manuel, Doug MA14
 Marcus, Steven I. TB03
 Marcus, Steven MC20
 Marmol, A.M. SD08
 Marnay, Chris TA11
 Maruhn, Jan SB10
 Masuyama, Shigeru TC21
 Matsuhisa, Takashi TC15
 Matsui, Masayuki WD17
 Matsui, Tomomi MD09
 Matsuo, Hirofumi MC15
 Mattfeld, Dirk C. TB17, WE18
 Maurer, Maik TD04, WA16
 May, Ming-Der SB18
 Ma, Yu MB07
 Ma, Zhanyou WD03
 Mazumdar, Tridib TD03
 Mazzola, Joseph TC18
 McAllister, Scott TC03
 McGill, Jeff TB04
 McNickle, Don TC11
 Megow, Nicole WC16
 Mehta, Chetan SB18
 Meiler, Markus MC17
 Meissner, Martin SB19
 Meloche, Jean SA02
 Mendelson, Haim TC04
 Mendez, J. TB14
 Menezes, Mozart WD18
 Meng, Kevin H.-M. WC20
 Meng, Qiang SC18, TD17, WA17
 Meurer, Steven WB14
 Meyr, Herbert TA17
 Miao, Linyan WE06
 Michailidis, George SB02
 Mild, Pekka TA08
 Milla, Carlos MB21
 Mincsovcics, Gergely SB06
 Min, Jae Hyung TC16
 Mirchandani, Prakash MB10
 Misra, Sheo G. MD04
 Missbauer, Hubert TB10
 Miura, Hidetoshi WB18
 Miyashiro, Ryuhei MD09
 Miyashita, Kazuo MC15
 Miyazaki, Tomoaki WB16
 Miyazawa, Hajime WA18
 Mladenovic, Nenad WD20
 Mobark', Nahid WD09

Mo, Daniel TC17
 Moellering, Karin WD13
 Mohan, Avvari WC15
 Mohan, Usha TB13
 Moki, Mieko WB16
 Monoy, Darlene WE09
 Moon, Tae Hee SB19
 Morabito, Reinaldo WC05
 Moré, Jorge TC19
 Morita, Hiroshi MC15
 Morohosi, Hozumi SC03, WA18
 Mortagy, Yehia TC13
 Motohashi, Manabu WD17
 Mubashir Khan, Muhammad WC12
 Mu, Lifeng WE20
 Muñoz, David MD03
 Munson, Todd TC19
 Muramatsu, Masakazu MD10
 Muraio, Mikihiko TC13
 Murat, Alper TC18

N

Nadkarni, Sucheta WE12
 Naenna, Thanakorn MC03
 Nagurney, Anna TB07
 Nair, Vijay SB02, SC01
 Nakagawa, Hidetoshi MA20
 Nakai, Teruhisa SD08
 Nakashima, Takeru WE05
 Nakayama, Shin-ichi TC21
 Napel, Stefan TA15
 Narasimhan, Chakravarthi MB07
 Nash, Stephen G. MA03, TD18
 Natarajan, Hari MD06
 Natter, Martin MD17
 Nediak, Mikhail TB04
 Neebe, Alan TC18
 Nenes, George SB03
 Netessine, Serguei MC06
 Nevin, Daniel MC14
 Ngai, Eric W. T. WD15
 Ng, Chi To MA09
 Ng, Daniel WB09
 Ng, Ka-Lok MA16
 Ngo-Ye, Lin WD12
 Ng, Szu Hui SD01
 N, Hemachandra SC03
 Ni, Ruo-Yiao WC13
 Niu, Runhong (Annie) MA13
 Niu, Zhanwen WC04
 Nogeste, Kersti SB07
 Noori, Hamid MA12
 Nozick, Linda SB20
 Ntuen, Celestine MD01

O

Oguz, Ceyda MA09
 O'Hanley, Jesse SD03
 Oh, Hong Choon TA09
 Oh, Jungsuk WA12
 Oh, Lih-Bin TD12
 Ohshita, Masahiro TC21
 Oh, Soo-Mi SA08
 Okazaki, Tsukasa MC15
 Olla, Phillip TA14
 Olsen, Tava MA05
 O'Neill, Liam TD14

Ong, Qiyang TA11
 Oren, Shmuel MB11
 Ormeci, Lerzan MD06, TA06, TB16
 Ou, Jinwen SA09
 Oum, Yumi MB11
 Ouncharoen, Rujira WE14
 Ouyang, Yen-Ching SC19
 Oyama, Tatsuo SC03, WA18
 Ozcan, Yasar TD14
 Ozden, Hazal MD06
 Ozekici, Suleyman SC10
 Ozer Stillman, Ipek WA14
 Ozer, Ozalp SA06, MC05, TC05
 Özlen, Melih MA06
 Özpeynirci, Özgür WB15
 Oztop, Salih WA13

P

Pacciarelli, Dario SC03
 Pac, Fazil SB06
 Padman, Rema TA14
 Panagiotidou, Sofia WE01
 Pandit, Amit TB16
 Pang, Jong-Shi SC10
 Pang, Sulin MD19
 Pang, Zhan MD05, WB13
 Panton, David SB09
 Pantumsinchai, Preecha TB09
 Pan, Yunpeng TD09
 Pan, Zhendong WE20
 Papier, Felix SA18
 Park, Cheol TB12
 Parker, Rodney MA05
 Park, Eui MD01
 Park, Jong Heung TD16
 Park, Jong-Ho TB11
 Park, Joon TB06
 Park, Minhye MB21
 Park, Sangyong SB03
 Park, Yongtae SB03, MD15
 Parlakturk, Ali TC04
 Parlar, Mahmut TB13
 Pasupathy, Raghu TB03
 Patkai, Bela WD04
 Pattit, Jason WA16
 Pearn, Wen Lea WA08, WC08
 Peeta, Srinivas WE18
 Pei, Pamela TD05
 Peng, Huatao SB04
 Peng, Rose TC05
 Pentecost, Eric TB15
 Pereira, Manuel TD12
 Peremans, Herbert WD06
 Perng, Chyuan MB16
 Perrone, G. SA20
 Perry, Leonard MD01
 Peter, Selvan WE12
 Piller, Frank WE04
 Pince, Cerag WD13
 Piot-Lepetit, Isabelle SB08, MC11
 Pitakaso, Rapepan WC20
 Poli, Patricia SA03
 Possani, Edgar MD20
 Potter, Bonnie MD16
 Potts, Chris N. SD09, WE05
 Power, Daniel SC19
 Pranzo, Marco SC03
 Prasad, Ashutosh SA05, TD21

Preckel, Paul SD05
 Pundak, David TA07
 Punkka, Antti TA08

Q

Qiao, Hong SC02
 Qi, Cong SC19
 Qingzhen, Zhao WD20
 Qing, Zhu SB18
 Qiu, Donglei WA21
 QiuHong, Zhao WC13
 Qi, Xiangtong MA09, TB03, TC09
 Quadt, Daniel MB17
 Quante, Rainer MD17
 Qu, Ting WC19

R

Rabbani, Masoud WA15
 Radcliffe, Nick MC07
 Radovitsky, Zinovy SB04
 Radzikowski, Pawel WC10
 Raghunathan, Srinivasan WA03
 Raivio, Tuomas TC08
 Rajagopalan, Raj TC04
 Rajasekera, Jay SB20
 Raj, S.P. TD03, WA16
 Ramsey, Mark WB07
 Rana, Arif TC13
 Rangaraj, Narayan SC03, WA09
 Rao, H.R. WB03
 Rao, Raghuraj TC03
 Rapoport, Amnon MC08
 Rasmy, Mohamed WD09
 Ratchford, Brian WA21
 Rauner, Marion TC14
 Raut, Sumit MD04
 Ravichandran, N. WA07
 Read, Grant TC11
 Reese, Josh MC14
 Rehkopf, Stefan TA17
 Reiner, Gerald MD17
 Ren, Justin WB05
 Ren, Yiguang WD11
 Rhee, Hyeun-Suk WB03
 Rhee, Jongtae SC19
 Rindisbacher, Marcel SD21
 Rocha, Patricio TC14
 Roche, David MA16
 Rodriguez Lozano, Gloria Isabel TC16
 Romeijn, Edwin WC06, WD14
 Romeis, James WB14
 Rong, Guobing MB17
 Rosling, Kaj SC06
 Rotchanakitumnuai, Siriluck MD12
 Roth, Brian TD06
 Roughan, Matthew SA02
 Roy, Nirjhar MC04
 Rudi, Nils TA05
 Ruero, John MC16
 Rungie, Cam TD03
 Ruperez Micola, Augusto MB11
 Ryan, Jennifer TA01, TC06
 Rybko, Alexandre SC04
 Ryoo, Hong Seo WB10
 Ryu, Ho-Jung TB11

S

- Sadfi, Chérif WD05
 Sadoski, Alexey TC15
 Sagara, Nobusumi MC20
 Saito, Masaaki MA21
 Salahuddin Hyder, Syed TD20, WC03
 Salazar Gonzalez, Juan Jose WD20
 Salle, Mathias WD15
 Salo, Ahti TA08
 Salter, Bill MC14
 Santhanam, Hemalatha TB16
 Sargut, Zeynep WC06
 Sarich, Jason TC19
 Sarin, Rakesh MD08
 Sarin, Subhash TB13
 Sasaki, Mihiro WA18
 Sasaki, Motohiko MC15
 Sattar, Sohail TD20
 Sauer, Paul WC21
 Savas, Selcuk WA06
 Sawada, Kiyoshi TB20
 Sawaki, Katsushige SD21, MB21, WE13
 Scaparra, Maria Paola WD18
 Scheinker, Eugen MC03
 Scholz, Soeren W. SB19
 Schreck, Helmut WD05
 Schubert, Renate SC08
 Schuerer, Marc SC08
 Schull, Michael MA14
 Schutz, Amanda WC14
 Schwartz, Brian MA14
 Schwarz, Sigrun TC14
 Sciomachen, Anna TD14
 Seale, Darryl A. MC08
 Seetharaman, Seethu MB07
 Segura, Esther MB14
 Seila, Andrew MA14
 Selvarasu, Suresh TC03
 Sen, Alper WA13
 Sendil, Nuri TB13
 Sengupta, Raghu N. MB03
 Seo, Sanghyeok WA01
 Seren, Cetin TB20
 Seshadri, Sridhar MB13
 Sethi, Suresh MA18
 Severino, Felipe MB21
 Shah, Vaibhav WC14
 Sha, Jichang WD11
 Shang, Kevin H. MB05
 Shang, Shouting WD03
 Shan, Guangcun WE12
 Shan, Guang-cun MA16
 Shanker, Kripa MB03
 Shanker, Murali TB07
 Shan, Man-Kwan WA19
 Shao, Bin TC07
 Shao, Xinyu TC02
 Sharman, Raj WB03
 Sharma, Rk WB16
 Shen, Chun-Ying SB07
 Sheng, Olivia TA12, TB14
 Shen, Houcai MC09, MD05, WD19
 Shen, Max WC06
 Shen, Yanfang TD19
 Shen, Youxun MB11
 Sherman, H David WA14
 Sheu, Calvin WE02
 Sheu, Jiuh-Biing TD16, WC16
 Sheu, Ruey-Lin SC10
 Shi, Chunming MB13
 Shieh, Chich-Jen WA12
 Shieh, Ming-Yuan TC12
 Shigeru, Mase WE01
 Shih, Yu-Lin WA20
 Shi, Jan SC01
 Shi, Jin MD14
 Shi, Leyuan TD09
 Shimada, Tomoaki TB21
 Shin, Hyo Duk TD05
 Shi, Ning TC17
 Shin, Juneseuk SB03, MD15
 Shin-Yuan, Hung MC19
 Shirodkar, Shamin A WE09
 ShiYan, Sun SB19
 Shojaie Baghini, Hamed TA13
 Shrin, Shrikrishna SB18
 Shugan, Steven WA13
 Shu, Jia TC09
 Shukla, Deepesh Chandra MC04
 Shu, Lianjie MD01
 Shum, Stephen SC05
 Shyng, Jhieh-Yu SC02
 Siddarth, S. WC21
 Siddique, Zahed WE04
 Siddiqui, Afzal TA11
 Simchi-Levi, David SC05
 Sim, Melvyn SD10
 Simon, Jay MA08
 Simpson, Timothy W. WE04
 Singh Kushwaha, Dharmender WD12
 Singh, Jagdip TD21
 Singh, Param WB21
 Singh, Surya WB16
 Singh, Vishal WD21
 Sin, Raymond G. WC21
 Sirvanci, Mete SA08
 Sivrikaya Perifoölu, Funda WE06
 Smith, Mark MC07
 Sniedovich, Moshe TA20
 Soares Machado, Maria Augusta MB08
 Sofer, Ariela SA10
 Sohn, So Young SB19, MA21, MC21, MD15, WC07
 Sohoni, Milind TB13
 So, Meko MC TA21
 Song, Bin SC08, WE06
 Song, Jeannette SD05
 Song, Qiang MC13
 Song, Whemying SA03, SB03, TA03, TD01
 Song, X.P. WC17
 Song, Yun Sook MC13
 Son, Young Jun MA04
 Soonyi, Wu MA02
 So, Rick TB06
 Sorimachi, Takako WB13, WC09
 Sosis, Greys SC05, MD13
 Soumis, Francois TD16
 Sounderpandian, Jayavel TC08
 Soylu, Banu WB15
 Spengler, Thomas Stefan TA17
 Srinivasan, Rajagopalan WA09
 Srite, Mark WD12
 Srivastava, Rajesh WE21
 Stadler, Werner TB10
 Stecke, Kathryn E. SA05, MD04
 Steimetz, Seiji MD18
 Stein, William E. MC08
 Stoumbos, Zachary WE01
 Strusevich, Vitaly MB09, WD05
 Stukel, Therese MA14
 Su, Chi-Hung(Jerry) MB12
 Su, Chuan-Jun WB19
 Sudasna-Na-Ayudhya, Prapaisri TB09
 Sudhir, K MB07
 Sugihara, Kokichi WE05
 Sun, Churen MB20
 Sun, Haibin MB11
 Sun, Peng SA05, SD10
 Sun, Peng SD10
 Sun, Shinn WB02
 Sun, Tien-Lung WB19
 Sun, Xiaoqing SC03
 Sun, Xin MC09
 Sun, Ya-Chung MD08, TD21, WA12
 Su, Ping TA05
 Su, Shih-Chieh MC16, MD16
 Suzuka, Ayami MD09
 Suzuki, Atsuo MB21, WA18
 Suzuki, Sadami TB21
 Suzuki, Tsutomu WB18
 Swaminathan, Jay MC05
 Swami, Sanjeev MD04
 Swanson, Abby TD14
- T**
- Tagaras, George SB03, WE01
 Takase, Keiji TC20
 Takehara, Hitoshi MA20
 Takezawa, Naoya SB20, MB21
 Talabis, Ryan WC03
 Talburt, John R. TA18, TD18
 Tamiz, Mehrdad WB15
 Tanaka, Keiichi SD21
 Tanaka, Ken-ichi WB18
 Tan, Baris TA06
 Tanfani, Elena TD14
 Tang, Ching-Hui SD18
 Tang, Christopher MB06
 Tang, Chuyun MD19
 Tang, Depin WE20
 Tang, Guochun SC09
 Tang, Lixin TB10, TD10
 Tang, Loon Ching MC01
 Tan, Joseph TA14, TB14
 Tantalo, Tanya WB03
 Tan, Tarkan SB06, TA06, WA06
 Tao, Guoqiang WC07
 Taseli, Aysun WB14
 Tasgaonkar, Devendra TB13
 Taudes, Alfred MD17
 Tavakkoli Moghadam, Reza WA15
 Tavares, Luis TD12
 Tayur, Sridhar MA05
 Teachamatheegul, Sittisak TB09
 Tempelmeier, Horst TB17
 Teng, Suyan TA03
 Teo, Chung-Piaw SB05, WB06
 Teo, Hock-Hai TD12
 Teo, Kok Lay SD21
 Testi, Angela TD14
 Thomas, Lyn C. SC02, MD20, TA21
 Thomas, Marlin TA01
 Thompson, Paul TD13
 Thonemann, Ulrich SA18, MD13, WD13
 Thorstenson, Anders WE13
 Tian, Chunhua TD07, WC09
 Tian, Naishuo WD03
 Tien-Chin, Wang WC15
 Ting, Ching-Jung WB19
 Tipping, James TC11
 Tipsuwan, Yodyium SD02
 Tirupati, Devanath WB13
 Toktay, Beril WA06
 Toktay, L. Beril TA05
 Tokunaga, Toshifumi MA20
 Toloie Eshlaghi, Abbas MA21
 Tong, K L TA09
 Tong, Wei SA18
 Torre, GianCarlo TD14
 Towill, D.R. SC17
 Toyoda, Nobuko MA20
 Toyozumi, Hiroshi SA08
 Tran, Vu WB16, WC12
 Troy, Phil MD20
 Tsai, Albert MC01
 Tsai, Jeffrey J.F. MA16
 Tsai, Jung-Fa SB08, MD02, WC13
 Tsai, Mei-Yu MD02
 Tsai, Pei-Hsiang MA19
 Tsai, Wen-Hsien SA19
 Tsai, Woan-Ling SB08
 Tsan-Ching, Kang MC19
 Tsang, Albert H.C. TC01
 Tseng, Chih-Hwang WD09
 Tseng, Chung-Li TA11
 Tseng, Mitchell M. TC04, TD04, WC04
 Tseng, S. T. TD01
 Tseng, Yuan-Jye WB19
 Tsubaki, Hiroe MB01
 Tsuchiya, Takashi MD10
 Tsui, Kwok SC01
 Tsung, Fugee SC01, MC01, TB01
 Tunca, Tunay TD05
 Turkay, Metin MA06, TC03
 Tutuncu, Ozkan MD12, WD01
 Tzeng, Gwo-Hshiung SC02

U

Uckun, Canan WA06
 Uddin Usmani, Wahab WD12
 Ulusoy, Gunduz WE06
 Umetani, Shunji TC21
 Uncles, Mark TD03
 Uncu, Onur SA06
 Uney Yukseketepe, Fadime TC03
 Upadhyayalu, Rajesh MA15
 Upadhyaya, Shambhu WB03
 Uzsoy, Reha WE18

V

Vaidya, Jaideep SA06
 van Beek, Paul MC17
 van de Velde, W. SC17
 Van den Poel, Dirk TB07, WE21
 van den Pol, Rob MC06
 Van den Schrieck, Christophe WD06
 van Donselaar, Karel MB06, MC06, MD06
 Van Houdt, Benny SD06
 Van Hui, Yer SD03
 Van Mieghem, Jan TA05
 Van Oudheusden, Dirk MD03
 Van Utterbeeck, Filip MD03
 van Woensel, Tom MA17, MB06, MC06, MD06, WD06
 Vandaele, Nico WD06
 Vaninsky, Alexander TC15
 Vaughn, Rayford WC03
 Venkat Kumar, AV Hema TD11
 Venkat Kumar, Natarajan TD11
 Venkateswaran, Jayendran MA04
 Verma, Arun MD21
 Vermeulen, Marian MA14
 Vernon, Zeng WB04
 Verter, Vedat TC18
 Vilcassim, Naufel MB07
 Vining, Geoff MB01
 Virine, Lev MB08
 Virtanen, Kai TC08
 Viswanadham, N TB13
 Volling, Thomas TA17
 Vyt, Dany SB08

W

Wadhwa, Subhash SA20, SB03, TA15
 Wagner, Ralf SB19
 Wagneur, Edouard WB09
 Wakinaga, Hiroyuki WE13
 Wallace, Stein W. WB17
 Wang, C-C. Fatima WE02
 Wang, Cheng-Lan WA20
 Wang, Chih-Chieh MC20
 Wang, Chong WC12
 Wang, Earl J. WE20
 Wang, Eric MB19
 Wang, Fang TC10
 Wang, Fei-yue MA04
 Wang, Fu-Chung TA14
 Wang, Fu-Kwun WC01
 Wang, Gongshu TB10
 Wang, Guang-min WC10

Wang, Guoqing MB09
 Wang, Hsu-Ping MB03
 Wang, Hui-Mei TB02
 Wang, Huimin MA09
 Wang, Jack MA19
 Wang, Jiamin WC16
 Wang, Jin-Yuan WC09
 Wang, Juite WA15
 Wang, Kaibo TB01
 Wang, Ke-Ming WC02
 Wang, Kuo-Hsiung WA08, WC08
 Wang, Kuo-Hsiung WA08
 Wang, Lizhi MD11
 Wang, Lusheng TA10
 Wang, May MB19, WC19
 Wang, Ming-Te MC02, WA17
 Wang, Morris WA12
 Wang, Peng-Sen MA02
 Wang, Qinan MA13
 Wang, Qing SA18
 Wang, Ruliang MD19
 Wang, Sheng-Pen MD21
 Wang, Shouyang TB08
 Wang, Siqun TB06
 Wang, Song SB10
 Wang, Tong WA06
 Wang, Tsung-Yin WA08
 Wan, Guohua SA09, WD09
 Wang, Wei-Hsiao SE02
 Wang, Xianjia WC10
 Wang, Xianpeng TB10
 Wang, Xiao SB02
 Wang, Xikui SA08
 Wang, Xin WA21
 Wang, Xingwei SA18
 Wang, Xiuli SA09
 Wang, Yan TC13
 Wang, Yaoqi SC08
 Wang, Yi TD12
 Wang, Yingjun MC03
 Wang, Ying-Ming MC02
 Wang, Yong SC10
 Wang, Yucheng WE04
 Wang, Yunzeng TB05, TB06
 Wang, Yuqiang (Billy) TB13
 Wang, Z. W. WA17
 Wang, Zhenbo TD07
 Wang, Zhonghao TC02
 Wang, Zhongren TB02
 Wang, Zhong-Xian MD12
 Wan, Yat-wah TC17, WD13
 Wan, Yulai SD03
 Wan, Zhongping SC07, WC10, WD09
 Warburton, Art SC20
 Warburton, R.D.H. SC17
 Warburton, Roger SD06
 Wasil, Edward MB10
 Watanabe, Satoshi TC13
 Watanabe, Yuichiro WC09
 Watson Manheim, Mary Beth WB03
 Weglicki, L. TB14
 Wei, Ding TD07, WC09
 Weigel, Glenn TB11
 Weihua, Zhou TC06
 Wei, Jerry MD05
 Wei, Jinyu WC15
 Weiskircher, Rene TA15
 Weiss-Cohen, Miri TC12

Wen, Fushuan TC11
 Wenger, Wolf WB15
 Weng, Michael TD09
 Westinner, Rafael MC17
 Wey, Wann-Ming TB11
 Widgren, Mika TA15
 Wigand, Rolf T. TA18, TD18
 Wijayatunga, Priyantha WE01
 Wilemon, Dave WA16
 Wirth, Andrew SB09
 Witchakul, Suwitchaporn TB09
 Wong, Andy SC18
 Wong, Christina MB18
 Wong, Collin SD03
 Wong, Elaine MC01
 Wong, Hannah SB04
 Wong, K.P. TC11
 Woo, TingTing SC17
 Wren, Howard WC16
 Wu, ChiaChun SC07
 Wu, Chihwen TD21
 Wu, Chin-Chia WC08
 Wu, Hong-Kuei TD12
 Wu, Jianghua SD05
 Wu, Jia-Yu MB12
 Wu, Jie WA02
 Wu, Kuei-Yang TB11
 Wu, Kuo-Chang SA04
 Wu, Muh-Cherng MB15, MB16
 Wu, Peitsang MB02
 Wu, Peng WA01
 Wu, Qiong TD05
 Wu, Qizong SD08
 Wu, Shih-Chia MD08, TD21
 Wu, Shih-Wei SC08
 Wu, Shujin MD01
 Wu, Soushan SC07, WD02
 Wu, Su-Hwa MA13
 Wu, Tai-Hsi WC20
 Wu, Wen-Ping TB16
 Wu, Wen-Yen MB12, TC12, TC20
 Wu, Yan-Kuen SD02
 Wu, Yung-Yu WC16
 Wu, Zhengping SD07

X

Xia, Nan TC04
 Xiao, Baichun MD20
 Xiaodong, Jiang MA21
 Xiao-guang, Yang WC01
 Xiao-guang, Zhou SD03
 Xiao-Tong, Guo MC20
 Xiao, Y. B. MC09, WC17
 Xiaoya, Li WB10
 Xiao, You WD15
 Xia, Yu MD10
 Xie, Jinhong WA13
 Xie, Jinxing MD05
 Xie, Min SD01
 Xie, Xiaolan TC14
 Xing, Wenxun TD07
 Xinping, Shi MB18
 Xiong, Yue SA18
 Xu, Chunhui MD21
 Xu, Dongsheng TC17
 Xuehong, Li WD16
 Xue, Yaowen MA21
 Xu, He WA05

Xu, Ningxiong SB20, TA20
 Xu, Susan TD06
 Xu, Wei TD17
 Xu, X. L. MC09, WC17
 Xu, Xiaohui TC13
 Xu, Xin SA18
 Xu, Xiu-li WD03
 Xu, Xuewen WC07
 Xu, Yisu WD03
 Xu, Yu WD03

Y

Yagci, Kamil WD01
 Yagi, Kyoko SD21
 Yagiura, Mutsunori TC21
 Yamada, Shu MB01, MC01
 Yamada, Tetsuo WD17
 Yamamoto, Rei MA20
 Yaman, Hande MA14
 Yamashita, Hideaki WD17
 Yamashita, Nobuo SB17
 Yanasse, Horacio Hideki WC05
 Yan, Chen TB15
 Yang, Bibo MB09
 Yang, Bo TA15, WD09
 Yang, Chyan SC07
 Yang, Cuihong TB08
 Yang, Hai TD17
 Yang, Hao-Erl TA21
 Yang, Hee Dong WE02
 Yang, Hsin-Chang WA19
 Yang, Jian TC09, TD06, WA13
 Yang, Jianhui MD19
 Yang, Jiann-Min TA14
 Yang, Jiaqi MC18
 Yang, Jiayi TB17
 Yang, Jihui MB20
 Yang, Keng-Chieh SC07
 Yang, Liu WB17
 Yang, Seungjeong SC19
 Yang, Sha MB07
 Yang, Shanlin WA02
 Yang, Shilei MB13
 Yang, Wei MD20
 Yang, Xiaolou SD08, WB13
 Yang, Xiaoqi SB10, SD21
 Yang, Yang TD10
 Yang, Ying-Hsuan MB03
 Yan, Houmin TC06
 Yan, Jia MD18
 Yan, Jun SA01
 Yano, Candace TC06
 Yan, Shangyao SD18, WA20, WD09
 Yao, Andrew MC12
 Yao, David SC04, WA05
 Yao, Ming-Jong MB05, TA09
 Yau, Hoksung TD09
 Ye, Hengqing SC04
 Yeh, Jiajia TC07
 Yeh, Ming-Feng TA21
 Yeh, Yi-Jen WD02
 Yeh, Ying-Jung MB19
 Yen, Benjamin SD09, MB19, WC19
 Yen, Hsin-Yi MB05
 Yeo, Wee Meng MD05
 Yeung, Andy C.L. MB18
 Ye, Yinyu WD10

Yi, Gwangrim WB07
 Yilmaz, Ozlem TC03
 Yiming, Chen TC20
 Ying-Hsiu, Chen WC15
 Yin, Rui MB06
 Yip, T. L. MC18
 Yi, Wang TC20
 Yi, Yanqing SA08
 Yoon, Duk Young MD12
 Yoon, Moon-Gil SD03, MC13
 Yoon, Yong-Jin TB11
 Yoshimoto, Kazuho WB13,
 WC09
 Yoshise, Akiko MD09
 You, Jun-jeer WB08
 Youm, Se Kyoung SB19
 Yuan-Tao, Song SD03
 Yuan, Xue-Ming MD05
 Yu, Bin WD11, WD11
 Yu, Changrui WC15
 Yu, Chian-Son MD02
 Yu-Chin, Chang MC19
 Yu, Chun Yuan TC11
 Yue, ChaoYuan SA17
 Yue, Xiaohang WB05
 Yue, Yong WE05
 Yue, Yu WC13

Yufei, Du TB14
 Yu, Haiyang WB17
 Yu, Jiun-Yu WA16
 Yu, Run WE09
 Yu-Yi, Liu MD16
 Yu, Yimin TA06
 Yu, Zhang MC11, TB15
 Yuzhong, Zhang MA09

Z

Zakeri, Golbon MA11
 Zang, Wenan TA10
 Zan, Xin SD08
 Zarzuelo, Jose M. SD08
 Zayas-Caban, Gabriel TC14
 Zhang, Bin WC01
 Zhang, Dengfeng MC13
 Zhang, Feng SC09
 Zhang, Frank WB19
 Zhang, Fuqiang TB06, WB05
 Zhang, Guochuan SC09, MC09
 Zhang, Guojun TC02
 Zhang, Guoqing SA18
 Zhang, Hanqin SC04, TB08,
 TC06
 Zhang, Hongtao MC08, WA05

Zhang, Jiawei SD10, TC09, TC10
 Zhang, Jie WC15
 Zhang, Jihong SC09
 Zhang, Jun MC05
 Zhang, Kai SB10, SD21
 Zhang, Lin TA01
 Zhang, Michael WC21
 Zhang, Pengzhu MA21
 Zhang, Peter SB18, TB07
 Zhang, Qiang SD03
 Zhang, Qin TD21
 Zhang, Qinli TD04
 Zhang, Sheng Hao MD05, TB13
 Zhang, Shuzhong WD10
 Zhang, Xiaodan WC04
 Zhang, Xiaolong WA13
 Zhang, Xinyan TB15
 Zhang, Yin SA02
 Zhang, Yue TC18
 Zhang, Zaifang SA03
 Zhang, Zhe George SC20
 Zhang, Zhicong TD09
 Zhang, Zhongfu WA10
 Zhao, Hui TC06
 Zhao, Lan TB07
 Zhao, Qihong WD20
 Zhao, Xiande MD05

Zhao, Xuan MA13
 Zhao, Xueshun TC11
 Zhao, Xuying SA05
 Zhao, Yanjie TA07
 Zhao, Ying MB07
 Zhao, Yiqiang WD08
 Zheng, Huan WB06
 Zheng, Kai TA14
 Zheng, Li TD09
 Zheng, Shaohui WA05
 Zheng, Xiaona SD05
 Zheng, Yongyue TD10
 Zhi-quan, Xiao WD16
 Zhong, Hua TC09
 Zhong, Jin MB11
 Zhou, Chi TC02
 Zhou, Deming TB05
 Zhou, Sean Xiang WA09
 Zhou, Vickii Shu WB06
 Zhu, Joe WA02, WA14
 Zhu, Shu-Shang MD21
 Zhu, Wanshan SD07, TA13
 Zinder, Yakov WD09
 Zwarenstein, Merrick MA14
 Zwick, Rami MC08

Sunday, 8:00am - 9:30am

- SA01 Advances in Statistical Applications
- SA02 Joint Session Data Mining/QSR: Information Technology
- SA03 Simulation Based Optimization
- SA04 Quality and Reliability
- SA05 Flexibilities in Operations Management
- SA06 Supply-Chain Management
- SA08 Probability and its Applications
- SA09 Deterministic Scheduling Models and Applications
- SA10 Applications of Optimization I
- SA17 Networks Design
- SA18 Optimization of Logistics Systems
- SA19 Issues in Enterprise Resource Planning
- SA20 Strategic Management of Business Processes

Sunday, 10:00am - 11:30am

- SB01 Quality and Reliability Assessment in Nanofabrication
- SB02 Joint Session Data Mining/QSR:
Statistics in Industry and Business
- SB03 Decision Making using Optimization
- SB04 Models for Resource Allocation
- SB05 Issues in Supply Chain Management
- SB06 Capacity Issues in Supply Chains
- SB07 Issues in Strategic Planning
- SB08 Applications of Data Envelopment Analysis
- SB09 Scheduling and Logistics
- SB10 Applications of Optimization II
- SB17 Transportation and Traffic Assignment Models
- SB18 Vehicle Routing Problem II
- SB19 Decision Making Methods
- SB20 Risk Management in Public and Private Sectors

Sunday, 1:30pm - 3:00pm

- SC01 Panel Discussion: New Challenges and Trends in
Quality, Statistics, and Reliability Research
- SC02 Joint Session Data Mining/QSR
- SC03 Land Transportation
- SC04 Asymptotic Analysis of Stochastic Network
- SC05 Game-theoretical Models in Supply Chains
- SC06 Operational Control of Multi-Echelon and/or
Multi-Item Stochastic Production/Inventory Systems
- SC07 Strategy, Innovation, New Product Development
- SC08 Decision Analysis in Finance and Investment
- SC09 Modern Scheduling and Applications
- SC10 Ideas and Applications in Global Optimization
- SC11 Workshop: Scenarios for the Future of OR/MS Practice
- SC17 Supply Chain Dynamics and the Bullwhip Effect
- SC18 Sea Transportation and Logistics
- SC19 Information Systems Applications
- SC20 Queueing & Time Series

Sunday, 3:30pm - 5:00pm

- SD01 Statistical Methods in Quality and Reliability
- SD02 Fuzzy Mathematics Programming and its Application
- SD03 Logistics
- SD04 Economics of Supply Chain Management
- SD05 Supply Chain Modeling and e-Commerce
- SD06 The Bullwhip Effect, Inventory Fluctuations and
Customer Service
- SD07 Production and Supply Chain Systems
- SD08 Decision Analysis
- SD09 Scheduling Systems and Applications (SS&A)
- SD10 Approximation of Stochastic Programming:
A Robust Optimization Perspective
- SD11 Workshop: Scenarios for the Future of
OR/MS Practice (cont.)

- SD18 Logistics Policy and Management
- SD19 E-commerce and Applications
- SD21 Risk Analysis in Finance

Monday, 8:00am - 9:30am

- MA01 Statistical Modeling for Quality Manufacturing
- MA02 Fuzzy Decision Making and Preference Structures
- MA03 OMEGA RHO Featured Session
- MA04 Hierarchical Decision and Simulation System
for the Extended Enterprise
- MA05 Non-cooperative Supply Chain Models
- MA06 Scheduling/Re-scheduling
- MA08 Decision Analysis Involving Health and the Environment
- MA09 New Scheduling Models and Applications
- MA10 Simplicial Methods and Applications
- MA11 Models for Electricity Market Behaviour
- MA12 Models of Flexible Manufacturing Systems
- MA13 Inventory Decisions in Supply Chains
- MA14 Management of Healthcare Delivery Processes
- MA15 Recent Development in Technology Management
- MA16 Recent Advances in Bioinformatics
- MA17 Capacity Planning
- MA18 Supply Chain Logistics: Contracts and Incentives
- MA19 Customer Relationship Management and Business Strategy
- MA20 Financial Engineering and Markets
- MA21 Finance I

Monday, 10:00am - 11:30am

- MB01 Innovations in Design of Experiments
- MB02 Intelligent Fuzzy Systems and Applications
- MB03 Supply Chain Simulation
- MB04 Enterprise Integration
- MB05 Optimal Decision-making Models in Supply Chains
- MB06 Retail Operations I
- MB07 Structural Modelling of Market Outcomes
- MB08 Decision Making in Planning and Resource Allocation
- MB09 New Developments in Scheduling and Supply Chain
- MB10 Meta-heuristics
- MB11 Optimal Bidding and Risk Management in Energy Markets
- MB12 Intelligent Manufacturing and Scheduling
- MB13 Contracting in Supply Chains
- MB14 Operations Research & Management Applications in Mexico
- MB15 Managing New Product Development
- MB16 Applications on Semiconductor Manufacturing
- MB17 Advanced Planning: Models and Techniques
- MB18 Logistics Management: Challenges and Opportunities
- MB19 Implementation and Effect of E-Business Technology
- MB20 Nonlinear Programming: Theory and Applications
- MB21 Finance II

Monday, 1:30pm - 3:00pm

- MC01 Panel Discussion: New Challenges and Trends of
Six Sigma in Asia
- MC02 Foundations and Applications of Fuzzy sets and Systems
- MC03 Modeling of Global Commerce Relevant Production
and Business Events
- MC04 Analyzing Flexible Manufacturing Systems
- MC05 RFID and Operational Inefficiencies
- MC06 Retail Operations II
- MC07 Inside Strategic Marketing Software
- MC08 Behavioral Game Theory
- MC09 Scheduling Decisions in Supply Chain Management
- MC10 Advances in Integer Programming
- MC11 Environmental Policy Issues
- MC12 Control and Management of Manufacturing Systems
- MC13 Pricing Information in Supply Chains

- MC14 Optimization and Oncology
- MC15 Advanced Manufacturing Control Research in Japan
- MC16 E-Learning
- MC17 SCP Applications in Industry
- MC18 Maritime Logistics
- MC19 Decision Support Technology
- MC20 Dynamic Programming
- MC21 Risk Management: Theory and Empirics

Monday, 3:30pm - 5:00pm

- MD01 Statistical Methods for Quality Improvement: Applications and Theories
- MD02 Quantitative Management and Decision Analysis Under Changing Environment
- MD03 Simulation for Inventory & Risk Analysis
- MD04 Scheduling Issues in Flexible Manufacturing Systems
- MD05 Joint Session Supply Chains/ Stochastic Models: Modeling and Optimization of Supply Chains
- MD06 Modeling Customers in Operations
- MD08 Decision Making in Marketing
- MD09 Sports Scheduling
- MD10 Conic Optimization: Theory and Algorithms
- MD11 Optimal Scheduling and Planning for Power Systems under Market Environment
- MD12 Strategic Issues in E-Commerce
- MD13 Information Sharing in Supply Chains
- MD14 Optimization in Medicine & Biology
- MD15 Methods and Applications of Forecasting
- MD16 Creative Teaching
- MD17 Integrated Demand and Supply Management
- MD18 Joint Session STSC Logistics/Stochastic Models: Transportation and Transport Logistics
- MD19 Risk Management Method and Control
- MD20 Dynamic Programming Applications
- MD21 Portfolio Selection and Performance

Tuesday, 8:00am - 8:30am

- TA01 Reliability Models
- TA02 AI, ES, and Neural Nets Applications in Transportation
- TA03 Analysis and Optimization of Simulation Output
- TA05 Operational Flexibility and Real Options
- TA06 Matching Capacity and Demand
- TA07 Market and Customer Analysis
- TA08 Portfolio Decision Analysis
- TA09 Scheduling in Production and Distribution Systems
- TA10 Combinatorial Optimization: Polyhedra and Efficiency
- TA11 Financial Modelling of Electricity Markets
- TA12 Empirical Studies in E-Commerce
- TA13 Managing Uncertainties in Supply Chains
- TA14 eHealth Technologies & Issues I
- TA15 Decisions in Cooperated and Non-cooperated Environments
- TA16 Education and Knowledge Transfer
- TA17 Available-to-promise
- TA18 Joint SOLA/TSL: Cyber Transportation Logistics - The U.S. Perspective
- TA19 Data Mining: Techniques and Applications
- TA20 Linear Programming: Theory and Applications
- TA21 Managing Risks in Different Markets

Tuesday, 10:00am - 11:30am

- TB01 SPC for Multistage and Dynamic Processes
- TB02 Genetic Algorithm Applications in Manufacturing Problems
- TB03 Optimization via Simulation
- TB04 Revenue Management and Dynamic Pricing: Teaching and Applications
- TB05 Coordination and Competition in Supply Chains
- TB06 Coordinating Component Inventory in Assembly Systems
- TB07 Data Mining and Predictive Modeling in Marketing
- TB08 Panel Discussions on Decision Analysis in China

- TB09 Recent Advances in Sceduling
- TB10 Planning and Scheduling in Iron & Steel Industry (1)
- TB11 Problems in Forestry and Natural Resources
- TB12 Marketing and E-Commerce
- TB13 Sourcing and Purchasing
- TB14 eHealth Technologies & Issues II
- TB15 Applications of Economic Modeling
- TB16 Service Applications
- TB17 Integrated Supply Chain Planning
- TB18 Joint SOLA/TSL: Cyber Transportation Logistics - The Chinese Perspective
- TB19 Semantic Web and Intelligent Web Services
- TB20 Networks and Graphs
- TB21 Strategic Management of Logistics

Tuesday, 1:30pm - 3:00pm

- TC01 Panel Discussion: New Challenges of Quality Professionals in Asia
- TC02 Neural Networks and Data Mining
- TC03 Models and Algorithms in Computational Biology and Bioinformatics
- TC04 Economics of Customization
- TC05 Channel Management: Quality, Service and a Case Study
- TC06 Production-Inventory Systems
- TC07 Customer Relationship Management
- TC08 Issues in Decision Making
- TC09 Scheduling, Planning, and Outsourcing
- TC10 Integer Programming and Applications
- TC11 Power System Research in Asia-Pacific Region
- TC12 Intelligent System Design and Management
- TC13 Product Life Cycle Management
- TC14 Health Care Policy Modelling
- TC15 Economic Modeling
- TC16 Industry Applications I
- TC17 Container Handling
- TC18 Location Modes for Problems in the Public Domain
- TC19 Web Services and Application Builders for Optimization
- TC20 Methods in Artificial Intelligence
- TC21 New Frontiers of Combinatorial Optimization

Tuesday, 3:30 - 5:00pm

- TD01 Quality and Reliability
- TD02 AI, Data Mining, and Decision Making
- TD03 Marketing Science
- TD04 Mass Customization: Methods and Tools
- TD05 Information Asymmetry in Procurement
- TD06 Scheduling and Inventory Policies in Supply Chains
- TD07 Analytical Method and Optimization Application in Service Industry
- TD09 Scheduling Session
- TD10 Planning and Scheduling in Iron & Steel Industry (2)
- TD11 Neural Networks and Water Resources
- TD12 E-Business I
- TD13 Return Policy, RFID and Assortment Planning
- TD14 Health Care Performance Evaluations
- TD15 Models and Applications of Cost/ Performance Analysis
- TD16 Industry Applications II
- TD17 Transportation Network Modeling
- TD18 Joint SOLA/TSL: Cyber Transportation Logistics - A Panel Discussion
- TD19 RFID-Based Wireless Manufacturing
- TD20 Applications of Neural Networks
- TD21 Marketing Issues in Service

Wednesday, 8:00am - 9:30am

- WA01 Quality, Statistics and Reliability I
- WA02 Integrate Decision-making Methods into Efficiency Evaluation
- WA03 Economics of Information Security
- WA04 Mass Customization for Automotive Operations - Systems Analysis, Design and Management
- WA05 Joint Session Supply Chains/ Stochastic Models: Supply Chain Management
- WA06 Use of Information in Inventory Systems
- WA07 Forecasting and IT Enabled Supply Chain
- WA08 Queueing Models and Applications
- WA09 Supply Chain Planning & Scheduling
- WA10 Optimization of Varied Problems
- WA12 E-Business II
- WA13 Supply Chain Network and Decisions
- WA14 Healthcare Quality - I
- WA15 Multicriteria Decision Making
- WA16 Selected Topics on Research and Development
- WA17 Transportation Planning and Operations I
- WA18 Location Modeling
- WA19 Web Services for Data Mining Applications
- WA20 Heuristic Programming
- WA21 Economic Modeling in Marketing

Wednesday, 10:00am - 11:30am

- WB02 DEA Research in Taiwan
- WB03 Behavioral Issues of Information Security
- WB04 Supply Chain Decisions for Mass Customization
- WB05 Supply Chain Contracting and Pricing
- WB06 New Strategies for Managing Production and Inventory
- WB07 OR in Marketing and Sourcing
- WB08 Reliability Modeling and Optimization
- WB09 Job Shop Scheduling
- WB10 Techniques on Optimization
- WB12 An Editorial Panel: Perspectives on Publishing in Scholarly Research Journals
- WB13 Issues in Supply Chain and Logistics
- WB14 Healthcare Quality II
- WB15 Multicriteria Optimization
- WB16 Issues in Facilities Planning and Design
- WB17 Transportation Planning and Operations II
- WB18 Facility Location and Urban Transportation
- WB19 Industrial and Mobile Applications of Web-Service
- WB20 Heuristic Methods
- WB21 Strategic Marketing Plan

Wednesday, 11:45am - 1:15pm

- WC01 Quality, Statistics and Reliability II
- WC02 DEA Applications
- WC03 Information Security Practices
- WC04 Mass Customization Business
- WC05 Cutting and Packing I
- WC06 Inventory and Production Planning
- WC07 E-Commerce and IT
- WC08 Reliability and Queueing Applications
- WC09 Vehicle Routing Problem I
- WC10 Optimization Theory
- WC12 Information Security
- WC13 Optimal Inventory Policy
- WC14 Special Invited Session on Patient Safety
- WC15 Theory and Application of Analytic Hierarchy
- WC16 Logistics Network Design
- WC17 Pricing and Inventory Decisions in Supply Chain Management
- WC19 Business Processing Management
- WC20 Heuristic Approaches
- WC21 Marketing Business Application

Wednesday, 1:30pm - 3:00pm

- WD01 Quality Management in Different Sectors
- WD02 Knowledge Work and Organization
- WD03 Queueing
- WD04 Design of Mass Customization
- WD05 Cutting and Packing II
- WD06 Applied Stochastic Models
- WD08 Queueing Theory
- WD09 Project Scheduling
- WD10 Semidefinite Programming and Its Applications
- WD11 Models for Military Applications
- WD12 Issues in Information Systems
- WD13 Stochastic Inventory Models I
- WD14 Applications in Health Care
- WD15 Decision Support Systems
- WD16 Applications
- WD17 Demand-to-Supply System and SCM
- WD18 Reliability and Security Issues in Facility Location Planning
- WD19 Web-based Decision Support Systems: Theory and Applications
- WD20 Optimization I
- WD21 Understanding Consumers

Wednesday, 3:30pm - 5:00pm

- WE01 Measuring Quality
- WE02 Knowledge Resource
- WE04 Future Development of Mass Customization
- WE05 Cutting and Packing III
- WE06 Measuring Productivity and Management of Projects
- WE08 Queueing Models
- WE09 Production Planning and Scheduling
- WE12 Information and Decision Support Systems
- WE13 Stochastic Inventory Models II
- WE14 Health Care Issues
- WE15 Leadership and Team Management
- WE18 Logistics Systems
- WE20 Optimization II
- WE21 Selected Topics in Marketing

MASTER TRACK SCHEDULE

SUNDAY & MONDAY

KEY: S-Sheraton, H-Holiday Inn

		SUNDAY					MONDAY					
		SA	SB	Plenary	SC	SD	MA	MB	Plenary	MC	MD	Track
Room	Track	8:00am – 9:30am	10:00am – 11:30am	11:45am – 12:40pm	1:30pm – 3:00pm	3:30pm – 5:00pm	8:00am – 9:30am	10:00am – 11:30am	11:45am – 12:40pm	1:30pm – 3:00pm	3:30pm – 5:00pm	
S - Tang II	1	Quality, Statistics and Reliability		Plenary Ya-xiang Yuan S - Ballroom Floor 3	Quality, Statistics and Reliability		Quality, Statistics and Reliability		Plenary Hau Lee S - Ballroom Floor 3	Quality, Statistics and Reliability		1
S - Tang I	2	Data Mining & Knowledge Recovery			Data Mining & Knowledge Recovery	Fuzzy Sets and Systems	Fuzzy Sets and Systems			Fuzzy Sets and Systems		2
S - Ballroom A	3	Simulation – Optimization			Transportation	Logistics	FEATURED Session: Omega Rho	Simulation		Simulation		3
S - Ballroom B	4	Statistics / Quality Control	Resource Allocation		Stochastic Models of Logistics & Supply Chain		Production Systems & Management	Enterprise Integration		Flexible Manufacturing Systems		4
S - Ballroom C	5	Supply Chain Models			Supply Chain Models		Supply Chain Models			Supply Chain Models	Supply Chain I	5
S - Sung I	6	Operations Management			Operations Management		Operations Management			Operations Management		6
S - Sung II	7	No Session	Strategic Planning		Strategic Planning	Production Systems & Management	No Session	Strategic Marketing		Strategic Marketing	No Session	7
S - Ching	8	Probability	Data Envelopment Analysis		Decision Analysis		Decision Analysis			Decision Analysis		8
S - Ming I	9	Scheduling			Scheduling		Scheduling			Scheduling		9
S - Ming II	10	Mathematical Programming / Optimization			Mathematical Programming / Optimization		Mathematical Programming / Optimization			Mathematical Programming / Optimization		10
S - Boardroom	11	No Session			FEATURED Workshop: ORMS in Practice		Energy, Natural Resources and the Environment			Energy, Natural Resources and the Environment		11
S - Celestial Court Jade	12	No Session			No Session		Flexible Mfg. Systems	Intelligent Manufacturing		Manufacturing Systems	E-commerce	12
S - Celestial Court Pearl	13	No Session			No Session		Supply Chain Management			Supply Chain Management		13
S - Celestial Court Coral	14	No Session			No Session		Medical Applications			Medical Applications		14
S - Celestial Court Amber	15	No Session			No Session		Management of Technology	New Product Development		Advanced Mfg. Control	Forecasting	15
S - Celestial Court Amethyst	16	No Session			No Session		Biotechnology / Bioinformatics	Semiconductor Manufacturing		Education		16
H - Crystal Room 1	17	Network Design Transportation			Supply Chain Dynamics	No Session	Capacity Planning	Supply Chain Planning & Advanced Planning		Supply Chain Planning & Advanced Planning		17
H - Crystal Room 2	18	Logistics and Supply Chain	Logistics		Transportation & Logistics		Shipping, Transportation & Logistics			Shipping, Transportation & Logistics		18
H - Crystal Room 3	19	Information Systems			Information Systems & Electronic Commerce		Information Systems & Electronic Commerce			Info. Sys./Electronic Commerce	Web-Service Related Technology	19
H - Jade Suite 1	20	Business Process	Risk Analysis		Queueing & Time Series	No Session	Financial Engineering	Nonlinear Programming		Dynamic Programming / Control		20
H - Jade Suite 2	21	No Sessions			No Session	Finance - Risk Management	Finance – Theory & Empirics			Finance-Risk Mngt. -Portfolio Performance		21

MASTER TRACK SCHEDULE TUESDAY & WEDNESDAY

KEY: S-Sheraton, H-Holiday Inn

		TUESDAY				
		TA	TB	Plenary	TC	TD
Room	Track	8:00am – 9:30am	10:00am – 11:30am	11:45am – 12:40pm	1:30pm – 3:00pm	3:30pm – 5:00pm
S - Tang II	1	Quality, Statistics and Reliability		Plenary Marshall Fisher S - Ballroom Floor 3	Quality, Statistics and Reliability	
S - Tang I	2	Artificial Intelligence, ES and Neural			Artificial Intelligence, ES and Neural	
S - Ballroom A	3	Simulation			Bioinformatics	Marketing Science
S - Ballroom B	4	No Session	Revenue Management and Dynamic Pricing		Mass Customization in Manufacturing	
S - Ballroom C	5	Supply Chains			Supply Chains	
S - Sung I	6	Production – Inventory Systems			Production – Inventory Systems	
S - Sung II	7	Practice / Strategic Marketing			Practice / Strategic Marketing	ORMS in Practice
S - Ching	8	Decision Analysis			Decision Analysis	No Session
S - Ming I	9	Scheduling			Scheduling	Logistics
S - Ming II	10	Discrete and Combinatorial Optimization			Discrete and Combinatorial Optimization	
S - Boardroom	11	Energy, Natural Resources and the Environment			Energy, Nat Resources	Neural Networks & Water Resources
S - Celestial Court Jade	12	E-commerce			Intelligent Systems	E-business
S - Celestial Court Pearl	13	Supply Chain Management			Supply Chain Management	
S - Celestial Court Coral	14	Health Applications			Health Applications	
S - Celestial Court Amber	15	Group Decision & Negotiation	Economic Modeling		Economic Modeling	Cost / Performance Analysis
S - Celestial Court Amethyst	16	Education	Service Applications		Industry Applications	
H - Crystal Room 1	17	Supply Chain Planning & Advanced Planning			Transportation Science and Logistics	
H - Crystal Room 2	18	Location Analysis/Transportation & Logistics			Location Analysis/Transportation & Logistics	
H - Crystal Room 3	19	Web-Service Related Technology			Web Service Related Technology	
H - Jade Suite 1	20	Linear Programming	Networks & Graphs		Artificial Intelligence	Neural Networks
H - Jade Suite 2	21	Finance – Risk Management	Strategic Mngt/Logistics		Combinatorial Optimization	Marketing Science

		WEDNESDAY					
		WA	WB	WC	WD	WE	Track
		8:00am – 9:30am	10:00am – 11:30am	11:45am – 1:15pm	1:30pm – 3:00pm	3:30pm – 5:00pm	
		Quality, Statistics and Reliability	No Session	Quality, Statistics and Reliability	Quality Management	Statistics / Quality Control	1
		Data Envelopment Analysis			Knowledge-Based Resource Management		2
		Information Security			Queueing	No Session	3
		Mass Customization in Manufacturing					4
		Supply Chains		Cutting and Packing			5
		Production – Inventory Systems				Productivity & Project Mgt	6
		ORMS in Practice		E-Commerce & IT	No Session	No Session	7
		Queueing Theory & Reliability Analysis			Applied Probability		8
		Logistics	Scheduling			Production & Scheduling	9
		Optimization Techniques			Math Programming / Optimization	No Session	10
		No Sessions			Military Applications	No Session	11
		E-business	Perspectives on Publishing	Info. Security / Technology	Information Systems		12
		Supply Chain Management		Inventory Management			13
		Health Applications					14
		Multicriteria Decision Making		Analytic Hierarchy Process	Decision Support Systems	Organization Theory	15
		Research & Development	Facilities Planning & Design		Applications	No Session	16
		Transportation Science and Logistics		Decisions in Supply Chain Management		No Session	17
		Location Analysis		No Session	Location Analysis	Logistics	18
		Web-Service Related Technology				No Session	19
		Heuristic Programming	Metaheuristics		Optimization		20
		Marketing Science					21



PUERTO RICO '07

INFORMS International

July 8-11, 2007
Westin Rio Mar Beach Resort & Spa
Rio Grande, Puerto Rico

ORGANIZING COMMITTEE

General Chair
Karla Hoffman
George Mason University
khoffman@gmu.edu

PROGRAM COMMITTEE

Program Chair
Robin Lougee-Heimer
IBM Research
robinlh@us.ibm.com

Industry-Research

Interface Chair
Ahad Ali
University of Puerto Rico

OR in the Americas Chair

Viviana Cesani
University of Puerto Rico

Sponsored Sessions Chair

Rajesh Ganesan
George Mason University

Practice Co-Chairs

Bjarni Kristjansson
Maximal Software
Stephen A. Strauss
AT&T Labs

Contributed Sessions Chair

Darek Nalle
University of Idaho

Tutorial Sessions Chair

J. Cole Smith
Univ. of Florida

LOCAL COMMITTEE

University of Puerto Rico –
Mayaguez
Alexandra Medina-Borja, Chair
Ahad Ali
Viviana Cesani

University of Puerto Rico –

Rio Piedras
Reza Emamy, Chair
Mario Cordova
Mariano Marcano
Luis Pericchi
Dieter Reetz

Submit an
abstract today!

Deadline:
January 15, 2007