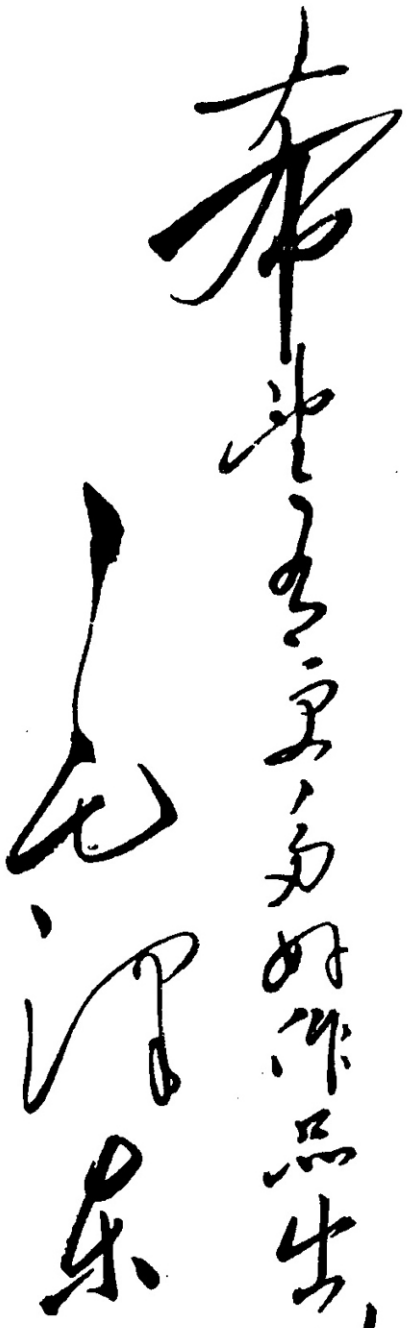
IEEE ical 2010

2010 IEEE International Conference on Automation and Logistics

August 16-20, 2010, Hong Kong & Macau, China



2010 IEEE International Conference on

Automation and Logistics

August 16 – 20, 2010

Hong Kong/Macau, China

CONFERENCE PROGRAM DIGEST

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Robotics Society of Japan

http://www.rsj.or.jp/

IEEE Hong Kong Joint RA and CS Chapter

http://www2.acae.cuhk.edu.hk/~ieee-racs-hk/

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Welcome

It is our great pleasure to welcome you to the 2010 IEEE International Conference of Automation and Logistics (IEEE ICAL 2010), which takes place at The Chinese University of Hong Kong in Hong Kong SAR, China and the University of Macau in Macau SAR, China from August 16 to 20, 2010.

IEEE ICAL 2010 marks the fourth event of the IEEE ICAL conference series. This year we have received 248 paper submissions from 15 countries and regions. After a rigorous full-paper peer-review process, 128 papers were accepted for oral presentation at the conference in 27 technical sessions, resulting in an acceptance rate of 51%. These papers reflect the dynamism of the research and development activities in automation and logistics, as well as the emergence of new research and development topics in addressing the ever-increasing challenges from the related industrial and societal needs.

The conference program is highlighted by three distinguished plenary speakers: Professor Chad Autry from the University of Tennessee, USA; Professor Jun Niu from Shandong University, China; and Professor Feiyue Wang from the Chinese Academy of Sciences, China. The main objective of the IEEE ICAL conference series is to provide a forum for researchers, educators, engineers, and government officials involved in Automation and Logistics to disseminate their latest research results and exchange views on the future research directions of the related fields. IEEE ICAL 2010, hosted in the Oriental Pearl, Hong Kong, and the Oriental Las Vegas, Macau, promises to be a great event for all participants, with an excellent technical program as well as social activities.

We wish to express our appreciation and gratitude to all the individuals who have contributed to IEEE ICAL 2010 in a variety of ways. Special thanks are extended to our colleagues in the technical program committee for their thorough review of all the submissions, which is vital to the success of this conference, and also to the members in the organizing committee and our volunteer students who have dedicated their time and efforts in planning, promoting, organizing and helping the conference. Last but not least, our special thanks go to distinguished plenary speakers, invited workshop speakers, as well as all the authors for contributing their latest research work to the conference, and to all participants in making IEEE ICAL 2010 a memorable event.

If your travel plans permit, we encourage you to extend your stay to enjoy visiting the Pearl River Delta region and the rest of China. We wish you a great conference and enjoyable visits in Hong Kong and Macau.

William R. Hamel
General Chair

Yangmin Li
Program Chair

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Zhu Chi		

General Information

Conference Venue

Esther Lee Building, The Chinese University of Hong Kong, Shatin, Hong Kong SAR, China

Website: http://www.cuhk.edu.hk

Hotel

Hyatt Regency Hong Kong, Sha Tin

18 Chak Cheung Street, Sha Tin, New Territories,

Hong Kong, China

Tel: +852 3723 1234

Fax: +852 3723 1235

Web: http://www.hongkong.shatin.hyatt.com

Conference Secretariat

IEEE ICAL 2010 Secretariat

The Chinese University of Hong Kong,

Shatin, N.T., Hong Kong, China

Tel: +852 2609-8290

Conference Registration

The IEEE ICAL 2010 Registration Desk is located in the Lobby of the Esther Lee Building, The Chinese University of Hong Kong. The conference registration desk opens from 14:00 on Sunday, August 15, 2010.

Dietary Needs

Conference delegates and partners with special dietary needs are invited to inform the conference secretariat at the IEEE ICAL 2010 Conference Registration Desk.

Welcome Reception

Date: Monday, August 16, 2010

Time: 18:00 – 19:50

Venue: Jumbo Kingdom Seafood Restaurant

Note: Taking bus at 16:00 at Esther Lee Building entrance. Admit with Jumbo Reception Ticket.

Award Banquet

Date: ***Wednesday, August 18, 2010***

Time: ***18:00 – 20:30***

Venue: ***Hyatt Regency Hong Kong Sha Tin Hotel***

Additional Equipment

Please note that each session room will be equipped with a LCD projector, screen, pointer device, microphone, and a desktop computer with general presentation software such as Microsoft PowerPoint and Adobe Acrobat reader preinstalled. If you plan to use your own computer, please try the connection and make sure it works well before your presentation.

Conference Proceedings

Conference registration includes a copy of the Conference Proceedings on a USB Key. Additional copies can be purchased at HK$400 each from the Registration Desk.

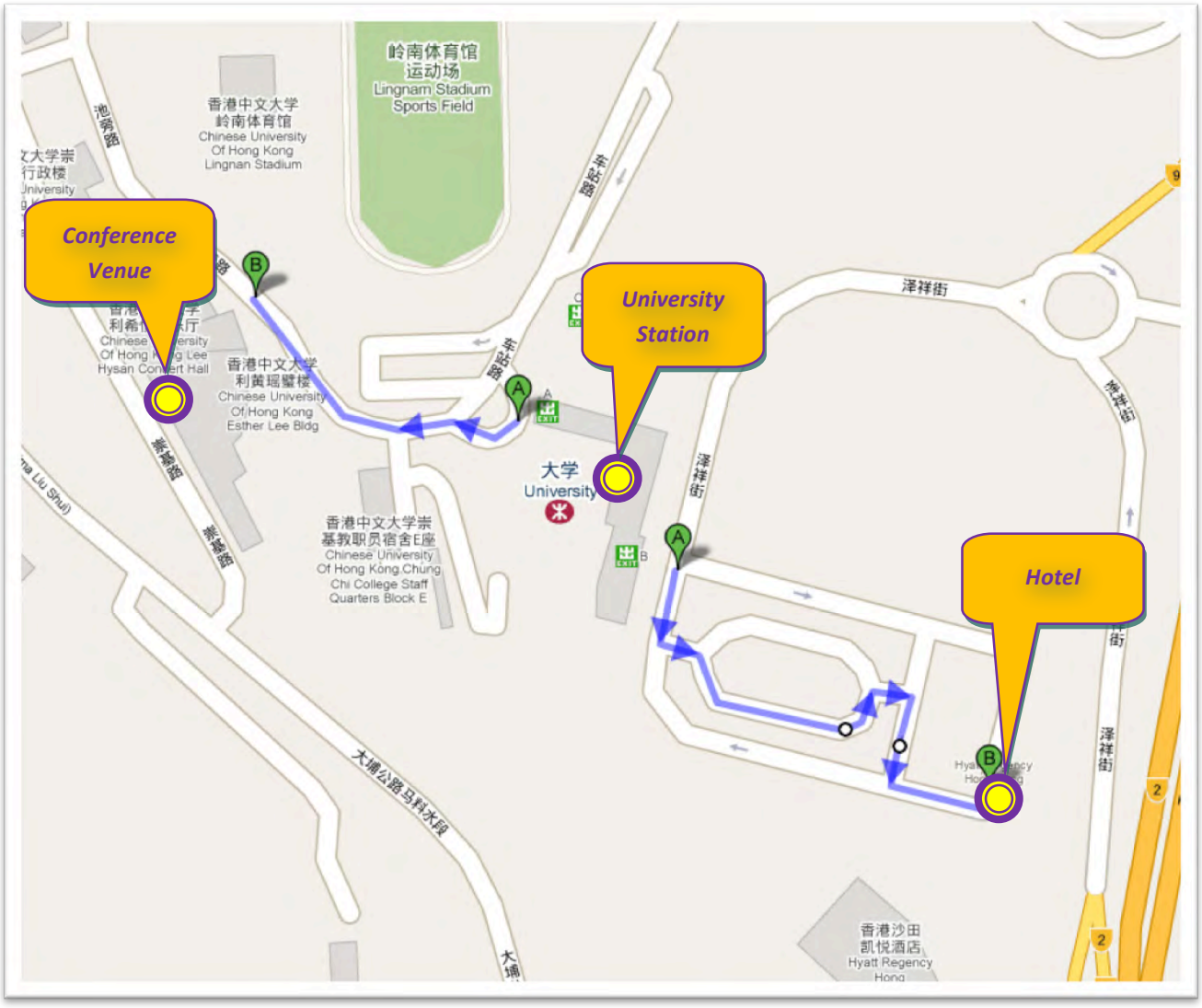
Internet Access

Wireless Internet access is available throughout the campus and in the conference rooms and the Lobby of Esther Lee Building. Login information is available at the registration desk.

Maps & Directions

Maps

*The **conference venue** and **hotel** are both within a three-minute walking distance from **University MTR Station**.*



Directions

From Hong Kong International Airport

Located at Chek Lap Kok, Hong Kong International Airport is conveniently accessible via taxi, Mass Transit Railway (MTR) or the hotel limousine service.

Limousine

Time - approx. 30 minutes. After customs, approach the Hyatt Limousine Desk located in front of exit B in the arrivals hall.

Taxi

Time - approx. 30 minutes

Operating hours - 24 hours

Charges - approx. HK$300 (US$40) including tolls, excluding levy for luggage and traffic

Reservations - go to taxi stand

From Luohu (Lo Wu) Custom

Time - approx. 22 minutes

Operating hours - 6:06am to 12:10am

Frequency - approx. every 3 to 15 minutes

Charges - HK$22.8 (US$2.90)

Reservation - purchase tickets at Lo Wu MTR Station

From Central

The central business district of Hong Kong, where many multinational financial services corporations and consulates of many countries are located, is accessible via Mass Transit Railway (MTR)

MTR

Time - approx. 45 minutes

Operating hours - 6:06am to 12:10am

Frequency - approx. every 3 to 15 minutes

Charges - HK$13.3 (US$1.50)

Reservation - purchase tickets at Central MTR Station

From Tsim Sha Tsui

Tsim Sha Tsui is a major tourist hub in metropolitan Hong Kong, with many shops and restaurants that cater to tourists. Many major museums are also located in the area.

MTR

Time - approx. 30 minutes

Operating hours - 5:28am to 12:23am

Frequency - approx. every 3 to 15 minutes

Charges - HK$8.50 (US$1.00)

Reservation - purchase tickets at Tsim Sha Tsui MTR Station

Local Information

Welcome to Hong Kong

Hong Kong is located in the Far East, just south of the Tropic of Cancer. Hong Kong Island is 32km (20 miles) east of the mouth of Pearl River and 135km (84 miles) southeast of Canton. It is separated from the mainland by a good natural harbour. Hong Kong Island was ceded to Britain in 1842 by the Treaty of Nanking; and the Kowloon Peninsula (south of Boundary Street and Stonecutters Island) in 1860 by the Convention of Peking. The area of Boundary Street to Shenzhen River and a group of 260 islands, now known as the New Territories, were leased to Britain in 1898 for a period of 99 years. The New Territories (plus the 260 islands) comprise 891 sq km (380 sq miles). Shortage of land suitable for development has led to reclamation from the sea, principally from the seafronts of Hong Kong Island and Kowloon.

Area: 1097 sq km (423.6 sq miles)

Population: 6,980,000 (2007)

Population Density: 6,096 per sq km

Government: Special Administrative Region of of China.

Overview

Time Zone

Time: GMT +8.

Language

Chinese and English are the official languages with Cantonese most widely spoken. English is spoken by many, particularly in business circles.

Business Hours

Generally, offices of commercial establishments and government departments are open from 9 am to 5 pm on weekdays. Some are open on Saturdays from 9 am to 1 pm. Major banks are open from 9 am to 4:30 pm on weekdays and 9 am to 12:30 pm on Saturdays.

Most shops and department stores are open daily from 10 am to 9 pm, while 24-hour convenience shops are located all over the city.

There is no sales tax on goods and services in Hong Kong. Hotels and restaurants usually add 10% service charge to their bills. Tipping may be appropriate when a service charge is not included.

Electricity

220 volts AC, 50Hz.

Climate

Hong Kong has a sub-tropical climate with seasonal changes. Go to www.hko.gov.hk for weather forecast before deciding what to pack.

Telephone

Directory enquiries services are computerised. For directory enquiries, dial 1081 (English) or 1083 (Chinese). Full IDD is available. Country code: 852. Outgoing international code: 001. Local public telephone calls can be made either with phone cards or coins. Local calls are free from private phones.

Mobile phones

GSM 900 and 1800 networks provide coverage on the mainland and throughout the island. Mobile telephones function all over the underground network.

Radio

English-language programmes can be heard on Radio 3 (567kHz), Quote AM 864 (864kHz), Metro Plus (144 AM), Hit Radio (99.7 FM), FM Select (104 FM) and BBC World (675 kHz).

Television

There are 2 English-language channels offering programmes from abroad. Satellite TV is provided by STAR TV.

Discover Hong Kong

For the most updated tourist information, please visit the website of the Hong Kong Tourism Board at www.discoverhongkong.com.

Currency and Credit Card

The Hong Kong Dollar (HK$) is the unit currency used in Hong Kong. One US dollar is about HK$7.70. Most foreign currencies and traveler's cheques can be changed over banks, hotels and moneychangers. There are no restrictions on the type or amount of money that can be brought into or taken out of Hong Kong.

All major credit cards are widely accepted in Hong Kong and can be used to obtain cash advances at banks and automatic teller machines (ATMs). ATMs can be found almost everywhere and provide 24-hour cash withdrawal (HK$).

Public Transportation

Hong Kong is so compact that getting around is quick and easy. An efficient public transport system – networks of urban underground trains (MTR), numerous routes of trams, buses and ferries – enable visitors to explore Hong Kong conveniently and safely on their own.

Airport Express Travel Pass not only takes you to/from the airport; it also allows you to travel within the city by MTR for 3 consecutive days. For further information, please visit: http://www.mtr.com.hk

Newspapers

The three dailies in Hong Kong include the South China Morning Post, The Hong Kong Standard and Eastern Express (except for Sunday).

You can also get business-related publications such as the Asian Wall Street Journal and International Herald Tribune as well as foreign publications (Time, Newsweek, etc) at hotels and newsstands around town.

Hong Kong Tourist Attractions

Disneyland Park

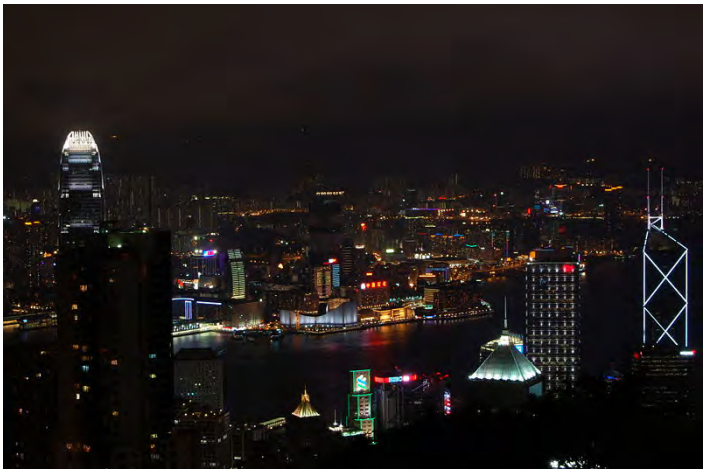
Hong Kong Disneyland is located on Lantau Island, surrounding by mountains at three sides and facing the South China Sea.

As the fifth Disneyland Park built in the mode of Disneyland and the eleventh theme park of Disneyland in the world, Hong Kong Disneyland Park is the first one take California Disney (including the Sleeping Princess Castle) as the base. On entering the park, you will be captured by the feeling of being in another world with countless excitement and adventures.

Victoria Peak

Victoria Peak is the highest peak in Hong Kong Island with an altitude of 554 meters and has been considered as a landmark of the island.

It is the best spot to have a bird's eye view of the Victoria Harbor and the whole thriving island.



A night view of the Harbor from the Vitoria Peak

Lantau Island


Lantau Island, with a size twice as big as Hong Kong Island, is the biggest island to the west of Hong Kong Island. Visitors can take a bus or the mass transit railway and reach the heartland of Lantau within 30 minutes from the city center. With wild countryside, monasteries, old fishing villages and seriously secluded beaches, Lantau Island, for those who are tired of the noise and polluted city life, is definitely a place to visit or even to live with. There are a lot of outdoor activities that people can do such as hiking, mountain biking, camping, fishing and etc.

Ocean Park

Hong Kong Ocean Park is located on the south end of Hong Kong Island. The larger of two sections is on the highlands on Mount Nanlang. The smaller section is in the Huang Zhu Keng Valley lowlands. With an area of 170 miles, it's one of the

largest ocean parks in the world. The two entrances to Ocean Park (Tai Shue Wan Entrance and Main Entrance) are connected by cable-car.

Convention and Exhibition Centre

The Hong Kong Convention and Exhibition Centre is located in the business center, Wan Chai District. It contains an area of 250,000sq.m. The center was the very place where British Government officially handed over Hong Kong's sovereignty to People's Republic of China. The monument and the bauhinia flower bronze statue (a gift from People's Republic of China to celebrate Hong Kong's return to the mainland) outside the building complex immortalize that great historical occasion. In addition, the three-storied arched house and wide glass curtain have become landmarks of Hong Kong. The convention and exhibition center is very large with hotel, office, shop and even house inside. All kinds of large-scaled exhibitions, business meetings and fashion shows have been held in it.

Avenue of Stars

The Avenue of Stars, modeled on the Hollywood Walk of Fame, is located along the Victoria Harbor waterfront in Tsim Sha Tsui, Hong Kong. It honors celebrities of the Hong Kong film industry. Tablets of 73 movie celebrities are inscribed on the surface of the avenue and 30 of them have handprints of the very celebrities.

Hong Kong - The Shopping Paradise

Hong Kong is the collection and distribution center of world's famous brands of products, known as the "Shopping Paradise" which is mainly concentrated in Tsim Sha Tsui and Causeway Bay. As a free port, Hong Kong showcases commodities without tariff and usually accompanied by seasonal sales. This "Shopping Paradise" sates every taste and budget.

Program Schedule

Sunday, August 15, 2010

14:00 – 18:00	Conference Registration in the Lobby of the Esther Lee Building, CUHK campus

Monday, August 16, 2010

09:00 – 10:00	Plenary Lecture I (Prof. Chad Autry) at Lecture Theater 1 of the Esther Lee Building
10:00 – 10:20	Morning Tea and Coffee Break
10:20 – 12:00	Technical Sessions MA in rooms 202, 205, 206, 207 of the Esther Lee Building
12:00 – 14:00	Lunch break with lunch served at the Chung Chi College Staff Club (Admission with lunch ticket)
14:00 – 15:40	Technical Sessions MP in rooms 202, 205, 206, 207 of the Esther Lee Building
15:40 – 16:00	Afternoon Tea and Coffee Break
16:00 – 16:45	Bus pickup at the Esther Lee Building and travel to TST (Admission with Jumbo reception ticket)
16:45 – 18:10	Victoria Harbor Boat Cruise and travel to Jumbo Kingdom (Admission with Jumbo reception ticket)
18:10 – 19:50	IEEE ICAL 2010 Reception at Jumbo Seafood Restaurant (Admission with Jumbo reception ticket)
19:50 –21:30	Travel by bus to the Peak and view the marvelous Victoria Harbor night view from the Peak
21:30 – 22:30	Travel back to the Chinese University of Hong Kong by bus

Tuesday, August 17, 2010

09:00 – 10:00	Plenary Lecture II (Prof. Jun Niu) at Lecture Theater 1 of the Esther Lee Building
10:00 – 10:20	Morning Tea and Coffee Break
10:20 – 12:00	Technical Sessions TA in rooms 202, 205, 206, 207 of the Esther Lee Building
12:00 – 14:00	Lunch break with lunch served at the Chung Chi College Staff Club (Admission with lunch ticket)
14:00 – 15:40	Technical Sessions TP in rooms 202, 205, 206, 207 of the Esther Lee Building
15:40 – 16:00	Afternoon Tea and Coffee Break
16:30 – 21:30	VIP/PC Dinner by invitation (Bus leaves from Esther Lee Building at 16:30, admission with invitation)

Wednesday, August 18, 2010

09:00 – 10:00	Plenary Lecture III (Prof. Feiyue Wang) at Lecture Theater 1 of the Esther Lee Building
10:00 – 10:20	Morning Tea and Coffee Break
10:20 – 12:00	Technical Sessions WA in rooms 202, 205, 206, 207 of the Esther Lee Building
12:00 – 14:00	Lunch break with lunch served at the Chung Chi College Staff Club (Admission with lunch ticket)
14:00 – 15:40	Technical Sessions WP in rooms 202, 205, 206, 207 of the Esther Lee Building
15:40 – 16:00	Afternoon Tea and Coffee Break
16:00 – 17:40	Technical Sessions WE in rooms 202, 205, 206, 207 of the Esther Lee Building
17:40 – 18:00	Walk from Esther Lee Building to Hyatt Regency Hong Kong Sha Tin Hotel for Banquet
18:00 – 20:30	Award Banquet at Hyatt Regency Hong Kong Sha Tin Hotel (Admission with Award Banquet Ticket)

Thursday, August 19, 2010

09:00 – 14:00	*Travel from Hong Kong to Macau by individual delegates, information on how to travel from Hong Kong to Macau is available at the registration desk.*
16:00 – 20:00	*Workshop registration at University of Macau.*
	Venue: Auditorium I, STDM, International Library of University of Macau
18:00 – 20:00	*Welcome Reception for all workshop participants*
	Venue: STDM, International Library, University of Macau.

Friday, August 20, 2010

09:00 – 09:30	*IEEE ICAL 2010 Workshop Opening Ceremony with the UM Rector and Vice Rector*
	Venue: Auditorium I, STDM, International Library of University of Macau
09:30 – 10:45	*Workshop I: Automation and Robotics A*
	Venue: Auditorium I, STDM, International Library of University of Macau
10:45 – 11:00	*Coffee Break*
11:00 – 12:40	*Workshop I: Automation and Robotics B*
	Venue: Auditorium I, STDM, International Library of University of Macau
12:40 – 14:00	*Lunch at Library Café (Lord Stow's Bakery)*
	Venue: 2nd Lower Ground Floor of the International Library of University of Macau
14:00 – 15:15	*Workshop II: Logistics and Control A*
	Venue: Auditorium I, STDM, International Library of University of Macau
15:15 – 15:30	*Coffee Break*
15:30 – 17:10	*Workshop II: Logistics and Control B*
	Venue: Auditorium I, STDM, International Library of University of Macau
17:30	*Closing of workshops*

Workshop I: Automation and Robotics

Chair: Prof. Dong Sun

09:30 – 09:55	*Human-robot interaction and interfacing*
	Speaker: Professor Simon X. Yang, University of Guelph, Canada
09:55 – 10:20	*A synchronization control approach to multiagent systems*
	Speaker: Professor Dong Sun, City University of Hong Kong, Hong Kong SAR, China
10:20 – 10:45	*Development of a Self-assisted Rehabilitation Training System*
	Speaker: Professor Shuxiang Guo, Kagawa University, Japan
10:45 – 11:00	*Coffee break*
11:00 – 11:25	*Dynamic Visual Servoing of Robotic Systems*
	Speaker: Professor Yunhui Liu, The Chinese University of Hong Kong, Hong Kong SAR, China
11:25 – 11:50	*Motion tracking: From 3D visual sensing to trajectory description*
	Speaker: Professor Youfu Li, City University of Hong Kong, Hong Kong SAR, China
11:50 – 12:15	*A Snake Robot based on Adaptive Mobile Mechanism: Mechanical Design and Basic Experiments*
	Speaker: Professor Shugen Ma, Ritsumeikan University, Japan
12:15 – 12:40	*Redundant manipulator*
	Speaker: Prof. Jun Wang, The Chinese University of Hong Kong, Hong Kong SAR, China

Workshop II: Logistics and Control

Chair: Prof. Jie Huang

14:00 – 14:25	*Advanced Motion Control: From Classical PID to Nonlinear Adaptive Robust Control*
	Speaker: Professor Bin Yao, Purdue University, USA
14:25 – 14:50	*Quantum Control*
	Speaker: Professor T.J. Tarn, University of Washington, USA
14:50 – 15:15	*Robust adaptive control of a class of nonlinear systems and its applications*
	Speaker: Professor Jie Huang, The Chinese University of Hong Kong, Hong Kong SAR, China
15:15 – 15:30	*Coffee break*
15:30 – 15:55	*Optimal kinematics design of a 3-DoF parallel mechanism with unlimited rotational capability*
	Speaker: Professor Yunjiang Lou, Harbin Institute of Technology, Shenzhen campus, China
15:55 – 16:20	*Parallel Manipulator for Fast Manipulation*
	Speaker: Xinhua Zhao, Tianjin University of Technology, China
16:20 – 16:45	*Sensor Networks*
	Speaker: Professor Max Q.-H. Meng, The Chinese University of Hong Kong, Hong Kong SAR, China
16:45 – 17:10	*Design and Control of Micromanipulator for Nano Manipulation*
	Speaker: Professor Yangmin Li, University of Macau, Macau SAR, China

Plenary Lecture I

9:00 – 10:00, Monday, August 16, 2010

Lecture Theater 1

Global Trends in Logistics and Supply Chain Management: The Role of Technology Now and in the Future

Professor Chad Autry

The University of Tennessee

USA

Abstract

In spite of recent economic downturns both in the US and worldwide, there remains a need for matching supply and demand through the efficient and effective practice of logistics and supply chain management. Citing recent data related to world market demand, this presentation explores current and future trends in logistics and supply chain management that are/will impact both global production and consumption sectors, and examines how these trends will be facilitated or inhibited

by technological innovation. Included are assessments of global transportation and freight capacity, infrastructure developments, and illustrations of the need for inventory visibility and positioning not only across multinational firm interfaces, but also among industry groups and nations. Implications for technological development and commercialization are also discussed.

Short Biography

Dr. Chad W. Autry is an Associate Professor of Logistics in the College of Business Administration at the University of Tennessee at Knoxville. Dr. Autry holds a Ph.D. in Business Administration with focus in Supply Chain Management from the University of Oklahoma, an M.B.A. with focus on International Business from Oklahoma City University, and a B.B.A in Marketing from the University of Oklahoma.

Dr. Autry's business background includes several years experience in retail and restaurant operations management. He also served as an information technology consultant prior to his move to academics. He has worked with and for numerous professional and civic organizations related to supply chain process improvement, including American Airlines, IBM, Goodwill Industries, the American Red Cross, the U.S. Air Force, and the U.S. Marine Corps. He is on the Education Strategies Committee of the Council of Supply Chain Management Professionals and has assumed active leadership roles at state and national levels for the Warehouse Education and Research Council, Production and Operations Management Society, Institute for Supply Management, National Association of Purchasing Managers, and the Supply Chain Management and Industrial Distribution Symposium.

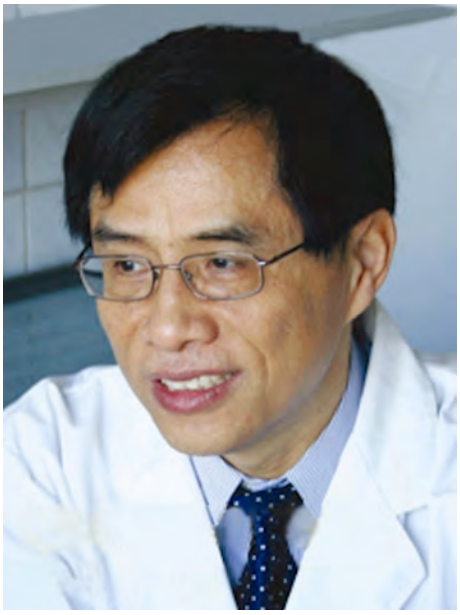
Dr. Autry's research focuses primarily on supply chain network design, with specific attention placed on issues related to relationship integration and technological connectivity and security across multiple firms simultaneously. He is author of over 40 articles in academic and professional outlets including Journal of Business Logistics, International Journal of Physical Distribution and Logistics Management, Journal of Operations Management, Journal of Retailing, Journal of Management, International Journal of Logistics Management, and Strategic Management Journal. He is currently the Systems/Analytical Research Editor for the International Journal of Physical Distribution and Logistics Management.

Plenary Lecture II

9:00 – 10:00, Tuesday, August 17, 2010

Lecture Theater 1

NOTES and Challenge in China



Professor Jun Niu

Shandong University

China

Abstract

With the rapid development of minimally invasive surgical techniques, a great interest has arisen for Natural Orifice Transluminal Endoscopic Surgery (NOTES). Compared with laparoscopic procedure, new NOTES technique not only has the potential to avoid abdominal wall incisions and eliminate related complications, but also to reduce postoperative pain and bring ideal cosmetic outcomes. Scarless surgery (NOTES) has been selected as one of Top 10 Medical Breakthroughs in 2008 by Time Magazine.

From May 2009 to June 2010 a total of 51 transvaginal human cholecystectomies have been performed by the Institute of Laparoscopic Minimally Invasive Surgery of Shandong University. A

single umbilical trocar was used for safe access and laparoscopic assistance during the operation. The procedure was successfully completed in all patients. There were no intraoperative or postoperative complications. Patients recovered promptly after surgery, and all of them were satisfied with ideal cosmetic outcomes. Compared to conventional LC operations, the postoperative pain, hospital stay, and cost of hospitalization for NOTES were greatly reduced.

Although specifically designed endoscopic instruments for NOTES are not available, we have conducted a study for performing transvaginal endoscopic cholecystectomy using a single umbilical trocar assistance and gained helpful initial clinical experience. The addition of an umbilical trocar is an optimal way allowing safe performance of NOTES procedures in an easily reproducible manner. Our initial experience demonstrates that this hybrid technique is feasible and effective for its potential to reduce postoperative pain and recovery times with improved cosmetic results in transvaginal cholecystectomy.

Natural orifice transluminal endoscopic surgery (NOTES) has been successfully performed at several research institutions around the world. However, several technical challenges for NOTES need to be solved such as how to achieve a safe access and leak-proof closure, spatial orientation barrier, and potential abdominal infectious complications.

To overcome some of these limitations which hinder safe clinical application of NOTES, several devices and instruments should have been explored to facilitate NOTES. Robotics is one potential technology that may be able to overcome the limitations. For example, an endoluminal NOTES robotic system should be developed. This system should consist of a master console with haptic interfaces, slave drive mechanisms, and flexible instruments located along with an endoscope. It's necessary to develop a type of robotic arm, with a shoulder–elbow–wrist configuration similar to the human. Multitasking platforms will also be designed for NOTES application.

Short Biography

Prof. Niu was associate professor and surgeon in Qilu hospital, Shandong Medical University before head to abroad in 1992. Since 1993 he get his advance general surgical training as surgical fellow, then surgeon in RPA hospital, Sydney University and John Hunter hospital, Newcastle University. In 2005, he was invited as the talented expert by Shandong University. Now he is the Shandong Provincial General Surgery Preeminence Academic Leader, and is rewarded the State Council special allowance in all his life. Dr. Niu has been engaged in general surgery over 30 years at home and abroad. He is China medical association surgery committee member, National Natural Science Foundation review expert, invited reviewer of **Cancer Letter** etc. vice director of **Chinese Journal of Current Advances In General Surgery**, **Tumor** and many other domestic reviewer. Dr. Niu is good at GI tract neoplasm malignant, liver, gall, pancreas, thyroid and breast surgery; especially, he is expert in laparoscopic minimal invasive surgery and other complicated operations. In China, he was the first surgeon who carried out the laparoscopic operation in 1991 and the first man who lunched NOTES (through virginal endoscopic cholecyctecotomy and appendicectomy) clinical operation in 2009. Prof. Niu supervises 26 PhD and post-graduates students, and is responsible for several items of national research projects. He has published more than 70 academic papers. During Si Chuan 8.2 degree Earthquake, he lead a rescue team to go to the site, working for 18 days and nights and having saved more than 1000 life. He was also a holder of torch relay in Beijing Olympic Game in 2008.

Plenary Lecture III

9:00 – 10:00, Wednesday, August 18, 2010

Lecture Theater 1

Parallel Control and Management for Networked Complex Systems: Production, Logistics, and Transportations

Professor Feiyue Wang

Chinese Academy of Sciences

China

Abstract

Parallel management has been proposed as a new mechanism for control of complex systems, especially those involve with both engineering and social complexity, such as production, logistics, and transportation systems. This talk presents an overview of the background, concept, basic methods, major issues, and current applications of Parallel Management Systems (PMS). The idea of parallel management originates in the concept of adaptive control where reference models are

running in parallel with actual controlled plants. The operation of PMS is based on the ACP framework in which **A**rtificial societies are used as "reference models" for modeling, **C**omputational experiments are utilized for analysis and evaluation, and **P**arallel execution are taken as tool for control and management. Essentially, parallel management is a data-driven approach for modeling, analysis, and decision-making that considers both engineering and social dimensions in its processes. Applications described here indicate clearly that PMS have a strong link with networked complex systems, cyber-physical-social systems, and social computing. Detailed description of the system architectures, methods, processes, and components of PMS and examples of their real-world applications based on cloud computing and wide area communication networks will also be illustrated and discussed.

Short Biography

Fei-Yue Wang received Ph.D. in Computer and Systems Engineering from Rensselaer Polytechnic Institute, Troy, New York in 1990. He joined the University of Arizona in 1990 and became a Professor and Directors of the Robotics and Automation Lab (RAL) and the Program in Advanced Research for Complex Systems (PARCS). In 1999, he found Intelligent Control and Systems Engineering Center at Chinese Academy of Sciences (CAS) under the support of Outstanding Oversea Chinese Talents Program. Since 2002, he is the Director of Key Lab of Complex Systems and Intelligence Science at CAS. Currently, he is the Dean of School of Software Engineering, Xi'an Jiaotong University, and Vice President of the Institute of Automation, CAS.

His major research interests include social computing, web science, complex systems, computational intelligence, intelligent systems and control. Applying intelligent technology in transportation systems is the current focus of his works.

From 1995-2000, Dr. Wang was the Editor-in-Chief of International Journal of Intelligent Control and Systems and Series in Intelligent Control and Intelligent Automation. Currently, he is the Editor-in-Chief of IEEE Intelligent Systems and IEEE Transactions on Intelligent Transportations Systems. He has served as Chairs of more than 20 IEEE, ACM, INFORMS, and ASME Conferences. He was the President of IEEE ITS Society from 2005-2007, Chinese Association for Science and Technology in 2005, and American Zhu Kezhen Education Foundation from 2007-2008. Currently he is Vice President and Secretary-General of Chinese Association of Automation.

Dr. Wang is member of Sigma Xi and an elected Fellow of IEEE, INCOSE, IFAC, ASME, and AAAS. In 2007, he received the National Prize in Natural Sciences of China and awarded the Outstanding Scientist by ACM for his work in intelligent control and social computing. In 2009, he received the IEEE ITS Outstanding Application Award for his contribution in developing agent-based networked traffic control systems.

Best Paper Finalists

1. Laser-Based Tracking of Randomly Moving People in Crowded Environments, by Masafumi Hashimoto, Tomoki Konda and Zhitao Bai
2. A New Descriptor for 3D Trajectory Recognition via Modified CDTW, by Jianyu Yang, Y.F. Li and Keyi Wang
3. Dynamic Modeling and Analysis of a Front-Wheel Drive Bicycle Robot Moving on a Slope, by Yonghua Huang, Qizheng Liao, Shimin Wei and Lei Guo
4. Design and Implementation of Low-cost Service Robot Mobile Platform for Intelligent Space, by Fengyu Zhou, Guohui Tian, Yang Yang, Hairong Xiao, Xuewei Wang and Wei Wang
5. Integrating HTN Planner in Cleaning-Security Robot: Handling Planning with Memory and Problem Template, by Jun Zhang, Li Zhang, Xiaoyu Li, Ying Hu and Jianwei Zhang
6. An Experimental Study on Leader-Follower Coalition Method for Solving Multirobot Task Allocation Problems, by Jian Chen and Dong Sun
7. Development of an Infrared Ray Controlled Fish-like Underwater Microrobot, by Baofeng Gao and Shuxiang Guo
8. Kinematic Analysis and Solution of the Natural Posture of a 7DOF Humanoid Manipulator, by Ye Tian, Xiaopeng Chen, Qiang Huang and Weimin Zhang
9. Bilateral Control for Omnidirectional Bending Motion of the DSD Forceps Teleoperation System with Time Varying Delay, by Hiroyuki Mikami, Yosuke Nishitani, Mitsutaka Hikita, Chiharu Ishii and Hiroshi Hashimoto
10. A Selection Method of Manual and Semi-automated Order Picking Systems based on Filling Curve and Time Model, by Changpeng Shen, Yaohua Wu and Danyu Zhang
11. Global Robust Output Regulation for Nonlinear Systems with iISS Inverse Dynamics, by Dabo Xu and Jie Huang
12. System Identification, Modeling and Precision Motion Control of a Linear Motor Drive Stage, by Jian Zhang, Chuxiong Hu, Bin Yao, Qingfeng Wang and Cong Li
13. Design of Ship Course Controller Based on Fuzzy Adaptive Active Disturbance Rejection Technique, by Yingbing Zhou, Weigang Pan and Hairong Xiao
14. Decentralized Control for Small-Scaled Conveyor Modules with Cellular Automata, by Tobias Krühn, Sascha Falkenberg and Ludger Overmeyer
15. Intelligent Control of Flexible-Joint Manipulator Based on Singular Perturbation, by SHAO Zhiyu and ZHANG Xiaodong
16. Multiple-Prior-Knowledge Neural Network for Industrial Processes, by Lou Haichuan, Su Hongye, Xie Lei, Gu Yong and Rong Gang
17. Analysis of EEG Signals during Acupuncture Using Spectral Analysis Techniques, by Nuo Li, Y. K. Wong, W.L.Chan and K. M. Tsang
18. Rule Driven Multi Objective Dynamic Scheduling by Data Envelopment Analysis and Reinforcement Learning, by Xili Chen, XinChang Hao, Hao Wen Lin and Tomohiro Murata
19. Condition Monitoring in Intralogistic Systems by the Utilization of Mobile Measurement Units, by Bernd K¨unne, Jan Eggert and Stefan Czarnetzki
20. Facility Locations Revisited: An Efficient Belief Propagation Approach, by Wenye Li, Linli Xu and Dale Schuurmans

Symbols for Sessions and Rooms

Days: ***M*** *= Monday,* ***T*** *= Tuesday,* ***W*** *= Wednesday*

Times: *Session* ***A*** *= 10:20 – 12:00*

Session ***P*** *= 14:00 – 15:40*

Session ***E*** *= 16:00 – 17:40*

Rooms and Room IDs:

Room ID	1	2	3	4
Room	ELB 202	ELB 205	ELB 206	ELB 207

Preparation Rooms:

Room ELB 203 and 204 are author preparation rooms.

List of Session IDs, Titles & Chairs

Monday, August 16, 2010

Session	Session title	Session Chairs	
MA-1	Computer Vision I	Chao Hu	Zhijie Zhang
MA-2	Robotics I	Hong Zhang	Youfu Li
MA-3	Supply Chain Management	Hing Kai Chan	Yuan Zhang
MA-4	Modeling and Simulation I	Baopu Li	Y. K. Wong
MP-1	Computer Vision II	Baopu Li	Dragomir Florin
MP-2	Robotics II	Hong Zhang	Shuxiang Guo
MP-3	Logistics Technology	Changcheng Zhou	Xubing Chen
MP-4	Modeling and Simulation II	Chao Hu	Youfu Li

Tuesday, August 17, 2010

Session	Session title	Session Chairs	
TA-1	Automatic Control I	Hong Zhang	Shuxiang Guo
TA-2	Robotics III	Xuezhang Hou	Biao Zhang
TA-3	Process Automation	S. S. Hiremath	Yong Yang
TA-4	Modeling and Simulation III	Shiwang Hou	Michael Decker
TP-1	Automatic Control II	Li Zhai	Anmin Zhu
TP-2	Robotics IV	Guangming Song	Xuezhang Hou
TP-3	Automation and Logistics	Hong Zhang	Yunhui Liu
TP-4	Modeling and Simulation IV	Yangmin Li	Baopu Li

Wednesday, August 18, 2010

Session	Session title	Session Chairs	
WA-1	Control and Automation I	Yutian Liu	Xiangzhong Meng
WA-2	Robotics V	Xuechao Chen	Xin Song
WA-3	Evaluation and Optimization	Baopu Li	Lei Chen
WA-4	Modeling and Simulation V	Timo R.Nyberg	Yue Zhao
WP-1	Control and Automation II	Simon Yang	Xingyu Jiang
WP-2	Biomedical Instrumentation	Chao Hu	Jingsheng Liao
WP-3	Planning and Scheduling I	Yunhui Liu	Timo R.Nyberg
WP-4	Network-based Systems	Yufeng Chen	Ruiquan Lin
WE-1	Control and Automation III	Simon Yang	Xingyu Jiang
WE-2	Instrumentation Systems	Yunhui Liu	Baoshan Shi
WE-3	Planning and Scheduling II	Li Li	Fengyu Zhou

Technical Session

Monday August 16, 2010

Technical Session

MA-1	Computer Vision I
MA-2	Robotics I
MA-3	Supply Chain Management
MA-4	Modeling and Simulation I
MP-1	Computer Vision II
MP-2	Robotics II
MP-3	Logistics Technology
MP-4	Modeling and Simulation II

MA-1:Computer Vision I

Session Chair: Chao Hu and Zhijie Zhang

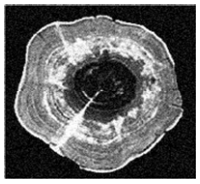
ELB 202 10:20-12:00 Monday, August 16, 2010

ELB 202 (1) 10:20-10:44

Self-adaptive Multi-Scale Weight Morphological Operator Applied to Wood Products Defects Testing by using Computed Tomography

Haiyan Gu and Lei Yu
Northeast Forestry University
Harbin, China

- Mathematical morphology in digital image processing .
- Wood Products non-destructive testing real-time imaging hardware and software system were built.
- And self adaptive multi-scale weight morphological operator was used in edge detection.
- Realized the real-time online detection of wood products X-ray computed tomography image.



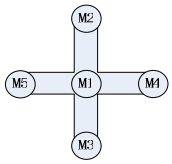
Wood CT image with noise

ELB 202 (2) 10:44-11:08

New Camera Calibration Method For Multi-Camera Localization

Bo Sun, Qing He, Chao Hu and Max Q.-H. Meng
Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences, Shenzhen, China

- The computation of Commixture matrix
- Constraints and computation of the intrinsic parameters
- Constraints and computation of the extrinsic parameters.
- The Closed-form solution
- Optimization using bundle adjustment



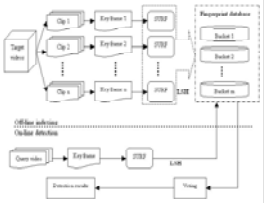
The model of calibration object

ELB 202 (3) 11:08-11:32

Video Copy Detection Based on Speeded Up Robust Features and Locality Sensitive Hashing

Zhijie Zhang, Chongxiao Cao, Ruijie Zhang, and Jianhua Zou
Systems Engineering Institute, Xi'an Jiaotong University
Xi'an, China

- Include fingerprint extracting and matching.
- Use Speeded Up Robust Features (SURF) to characterize a video in the fingerprint extracting.
- Use Locality Sensitive Hashing (LSH) based indexing to improve detection speed in the fingerprint matching.



The System Framework

ELB 202 (4) 11:32-11:56

An Obstacle Detection Approach of Transmission Lines Based on Contour View Synthesis

Gang Yao[1], Yong Liu[1], Fangmin Dong[1], and Bangjun Lei[1]
[1]Institute of Intelligent Vision and Image Information, Three Gorges University, Yichang, China

- In this paper, an obstacle detection approach based on contour view synthesis for inspection robot on transmission line is presented.
- The virtual contour images for multiple view of obstacles are reconstructed.
- Then the obstacle can be recognized by matching the extracted contour of obstacle and the virtual contours in the image library built before.
- The effectiveness of this method can be demonstrated by the experiment results.

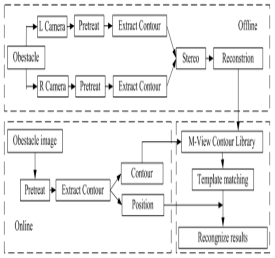


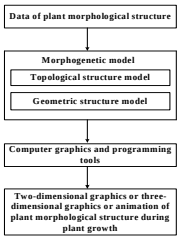
Diagram of the structure of our method

ELB 202 (5) 11:56-12:20

Morphogenetic Models of Virtual Plant: A Survey

Yuanyuan Fu[1], Dong Ren[1], Guangzhu Xu[1], Jihua Wang[2]
1. Institute of Intelligent Vision and Image Information, Three Gorges University, Yichang, China
2. National Engineering Research Center for Information Technology in Agriculture, Beijing, China

- In this paper, we mainly focus on the morphogenetic models of virtual plant.
- We divide the existing morphogenetic models into three categories: static models, non-interactive dynamic models and morphology-environment interactive models.
- Advantages and disadvantages of these models are analyzed.
- The remaining problems in the current morphogenetic modeling research are also pointed out.



The procedures for simulation and visualization of plant morphological structure

MA-2:Robotics I

Session Chair: Hong Zhang and Youfu Li

ELB 205 10:20-12:00 Monday, August 16, 2010

ELB 205 (1) 10:20-10:44

Laser-Based Tracking of Randomly Moving People in Crowded Environments

Masafumi Hashimoto, Tomoki Konda, Zhitao Bai, and Kazuhiko Takahashi
Doshisha University, Kyoto, Japan

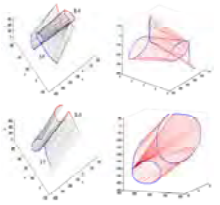
- People tracking system with multiple sensor nodes in an environment.
- Each sensor node consists of a two-layered laser range finder that detects the positions of waists and knees of people.
- The interacting-multiple-model-based tracker enables tracking people moving randomly and flexibly, such as walking, running, going/stopping suddenly, and turning suddenly.

ELB 205 (2) 10:44-11:08

A New Descriptor for 3D Trajectory Recognition via Modified CDTW

Yang Jianyu, Y. F. Li, and Keyi Wang
Joint Advanced Research Centre of City University of Hong Kong and University of Science and Technology of China, Suzhou, P. R. China

- A flexible descriptor and alignment method for motion trajectories plays an important role in recognition.
- A new signature descriptor with global information is used in motion recognition for tasks under variant circumstances.
- CDTW algorithm is modified and used as match engine.
- Performances of this method are shown in experiments.



The Recognition Alignment

ELB 205 (3) 11:08-11:32

Dynamic Modeling and Analysis of a Front-Wheel Drive Bicycle Robot Moving on a Slope

Yonghua Huang, Qizheng Liao, Shimin Wei, Lei Guo
School of Automation, Beijing University of Posts and Telecommunications
Beijing, China

- Physical model. The outstanding feature can be the track stand with zero forward velocity.
- Slope-Climbing Capability. Critical angle and critical driving torque were proposed to estimate the slope-climbing capability .
- Dynamic model. Dynamic model is developed by Kane's method.
- Numerical simulations. The model is in agreement with real working condition of the bicycle robot

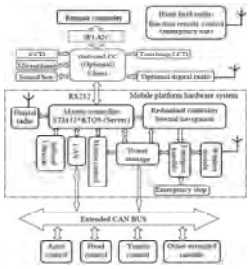
The front-wheel drive bicycle robot

ELB 205 (4) 11:32-11:56

Design and Implementation of Low-cost Service Robot Mobile Platform for Intelligent Space

Fengyu Zhou, Guohui Tian, Yang Yang, Hairong Xiao, Xuewei Wang and Wei Wang
Research Laboratory for Service Robotics, Shandong University Jinan, China

- The research background and research status about service robot mobile is briefly described.
- The details and results of its design arw proposed.
- Achieve the design of hardware circuit worked on the bottom control system of mobile platform.
- The introduction of the software system is gived.
- Experiment and application.



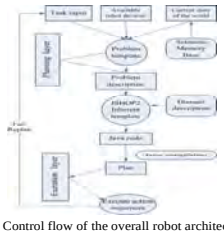
Structure diagram about hardware of the mobile platform

ELB 205 (5) 11:56-12:20

Integrating HTN Planner in Cleaning-Security Robot: Handling Planning with Memory and Problem Template

Jun Zhang[1,2], Li Zhang[1,2,3], Xiaoyu Li[1,2,3], Ying Hu[1,2], Jianwei Zhang[4]
1. Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences, Shenzhen, China
2. The Chinese University of Hong Kong, China
3. Dept. of Mechanical Engineering and Automation, Harbin Institute of Technology Shenzhen Graduate School, Shenzhen, Guangdong Province, China
4. TAMS,University of Hamburg, Hamburg, Germany

- This paper presents an HTN (Hierarchical Task Network) -based semantic planner integrating the robot's control system.
- Within a plan-based control framework, the problem of planning with partial observability is approached by using the robot's memory and the problem template.
- Some experimental results are given to verify the effectiveness of the developed approach.



Control flow of the overall robot architecture

MA-3:Supply Chain Management

Session Chair: Hing Kai Chan and Yuan Zhang

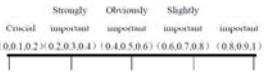
ELB 206 10:20-12:00 Monday, August 16, 2010

ELB 206 (1) 10:20-10:44

Research on the ABC Classification Based on DEA and Fuzzy Method for Military Materials

Wan Jie, Wang Wen, Ya-nan Luo
Department of Industry Engineering, School Of Management, Hebei University of Technology, Tianjin, China

- The paper develops the existed model to adjust military materiel's classification.
- With the full use of DEA (Data Envelopment Analysis) and fuzzy method, this model could make the results more detailed, reasonable and effective.
- This model can be widely used in military materiel inventory management work .



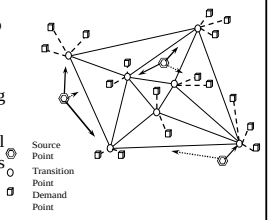
The Triangular Fuzzy Number Polarization Ratio Method

ELB 206 (2) 10:44-11:08

Routing Decisions with Recycle and Handling Reliability Options in Distribution Network using Genetic Algorithm

Sai Ho Chung[1] and Hing Kai Chan[2]
1. Department of Industrial and Systems Engineering, Hong Kong Polytechnic University, HK
2. Norwich Business School, University of East Anglia, UK

- Include recycle and handling reliability to solve the distribution network problem.
- A GA is proposed to solve the problem.
- Numerical examples show that optimizing one single factor will sacrifice the others.
- The proposed GA can improve the overall performance by considering all the factors simultaneously.
- Different settings have be tested as sensitivity analysis.



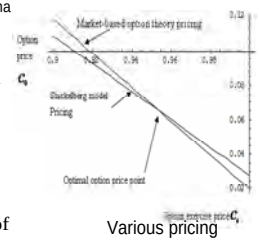
Distribution network in this study

ELB 206 (3) 11:08-11:32

Coordination Mechanism by Option Contract in the Biomass Supply Chain Organized by "Company and Farmer"

Huibo Gong, Yong Zhang , Jian Li
School of transportation, Southeast University
Nanjing, China

- Biomass bioenergy supply chain contract design is very important.
- An appropriate option strategy with a solely one pricing strategies solution was proposed.
- The company's spot order quantity is much smaller than its options order quantity.
- The option price is only about 6% of the market price.



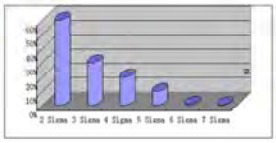
Various pricing relationship in our model

ELB 206 (4) 11:32-11:56

Research on the significance of Six-Sigma's Implementation in Logistics Corporation

ZhangYuan[1], XuYan[2], ZhaoXuan[3]
1. Department of Transport and Logistics, Shandong Jiaotong University, Jinan, Shandong
2. Department of Transport and Logistics, Chang'an University, Xi'an ,Shanxi
3. Department of Educational Research, Transport Management Institute of Shandong, Jinan, Shandong

- Six-Sigma method is a method targeting on perfection of quality management with its base rooted in date.
- It could reduce the flow rate to 3.4 times per million opportunities through the reengineering and improving business process.
- This article shows the Six-Sigma quality process's operation pattern, and the differences between Six-Sigma quality process and the traditional management method.



Sigma level

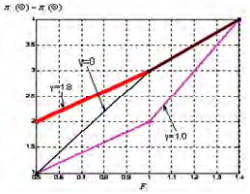
$$\sigma = \sqrt{\frac{\sum_{i}^{n} (Xi - \overline{X})^2}{n-1}}$$

ELB 206 (5) 11:56-12:20

Grey -game in Agricultural Perishable Products Supply ChainUnder Union

Lijuan Wang[1], Xichao Sun[1] and Hongwei Wang[2]
1. Department of Computer, University of Henan Agricultural, Zhengzhou, Henan, China
2. Department of of Control Science and Engineering, HuaZhong University of Science and Technology, Wuhan, Hubei, China

- Grey-game in a two-stage perishable agricultural products supply chain consisting of multi- peasant and a company . These peasants set up dynamic alliances.
- The grey game model under union is established.
- Two decision factors of cooperating between them are the penalty to breaking a treaty and the bonus to being rewarded, and the alliances affect the peasants violating a treaty rather than the company.
- Realize the united optimization and reaching Nash equilibrium in perishable agricultural products supply chain.



MA-4:Modeling and Simulation I

Session Chair: Baopu Li and Y. K. Wong

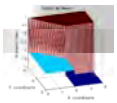
ELB 207 10:20-12:00 Monday, August 16, 2010

ELB 207 (1) 10:20-10:44

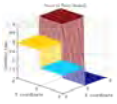
Study of Fuzzy Integral Decision Fusion Algorithm

XueHai Hu、HouJun Wang 、JianGuo Huang and YouGang Qiu
University of Electronic Science and Technology
ChengDu, China

- Determine the fuzzy density
$$g_k{}^i = g_k(\{s_i\})$$
- Construct a fuzzy measure
$$\lambda_k + 1 = \prod_{i=1}^{N}(1+\lambda g_k{}^i)$$
- Calculation of the membership of the need identify object for the types
$$\mu_{0k} = \int h_k \cdot g_k(\cdot), k = 1, 2 \cdots m$$
- Determine the type of the object A by using the maximum degree of membership criteria or vague expectations of the value of criteria



Fusion classification curves on Bayesian reasoning



Fusion classification curves on Fuzzy integral

ELB 207 (2) 10:44-11:08

Modeling of Water-jet Propeller for Underwater Vehicles

Shuxiang Guo, Xichuan Lin, Koujirou Tanaka and Seji Hata
Faculty of Engineering, Kagawa University
Japan

- The modeling of water-jet propellers is proposed in this paper.
- The incoming angle and velocity of the fluid is considered for the modeling.
- An experiment is designed for the modeling of the water-jet propeller.
- Experiment results are discussed and compared with the simulation results.

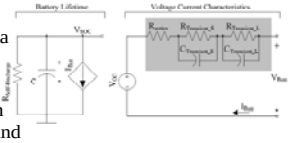
Water-jet Propeller

ELB 207 (3) 11:08-11:32

Lithium-ion Battery Models for Computer Simulation

K.M. Tsang[1], W.L. Chan[1], Y. K. Wong[1] and L. Sun[2]
1. *Department of Electrical Engineering, Hong Kong Polytechnic University, Kowloon, Hong Kong*
2. School of Electrical Engineering and Automation, Tianjin University, P. R. China

- The modeling of batteries is a complex procedure and requires a thorough knowledge of electrochemistry.
- In this paper, popular lithium-ion battery models are investigated and presented.
- Selection of appropriate models for a particular simulation will also be presented.



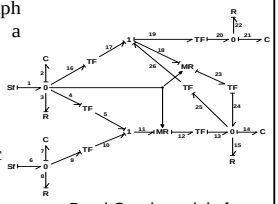
Improved electrical battery model

ELB 207 (4) 11:32-11:56

Modeling and Estimation Strategies for a Fed-batch Prototype Bioprocess

Monica Roman, Dan Selisteanu, Emil Petre, Cosmin Ionete and Dorin Popescu
Department of Automatic Control, University of Craiova, Craiova, Romania

- The work deals with the Bond Graph modeling and the estimation of a nonlinear bioprocess
- Pseudo Bond Graph modeling rules are applied to design the model of a fed-batch prototype bioprocess
- Extended Luenberger and asymptotic state observers were designed
- The unknown kinetics was estimated by using observer-based estimators



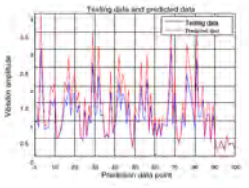
Bond Graph model of the bioprocess

ELB 207 (5) 11:56-12:20

Statistic Analysis and Predication of Crane Condition Parameters Based on SVM

Xiuzhong Xu Xiong Hu and Shan Jiang
Logistics Engineering College, Shanghai Maritime University
Shanghai , China

- The feature vectors with vibration and temperature are obtained.
- Training models of condition parameters based on support vector machine (SVM) are established.
- the penalty parameter and kernel function of model are optimized by cross validation.
- Model using vibration and temperature is much better than the results only by vibration signal or temperature modeling.



predicted result of temperature and vibration combination model

MP-1:Computer Vision II

Session Chair: Baopu Li and Dragomir Florin

ELB 202 14:00-15:40 Monday, August 16, 2010

ELB 202 (1) 14:00-14:20

Method for Video Incident Detection Based on Biological Visual Mechanism

Huibin Wang Qiuli Lu Xin Wang Guofang Lv and Lizhong Xu
College of Computer and Information Engineering, Hohai University
Nangjing, P.R.China

- This paper proposed a method for traffic event detection based on visual Mechanism on the background of traffic video surveillance applications.
- In this method, based on the extraction of video target motion characteristics, it extracted abnormal targets mainly through the features merging and significant competitive in video frames.
- Then it judged the events of abnormal targets.
- Finally, the simulation results of the method show that the method can effectively simplify the calculation of event detection.

The tracking result of the anomalous vehicles

ELB 202 (2) 14:20-14:40

Adaptive Mobile Camera Tracking Using Color and Topological Features

Lei Zhou, Lei Zhang, Yongsheng Ou, Shiqi Yu and Xinyu Wu
Shenzhen Institutes of Advanced Technology Chinese Academy of Sciences, China
Chinese University of Hong Kong, Hong Kong, China

- The combination of the color and the topological properties.
- The target is segmented into fragments.
- The Gaussian Mixture Model (GMM) represent the color of the target, with every fragment corresponding to a Gaussian model.
- A tree-liked structure construct from the spatial information represent the topology of the target.

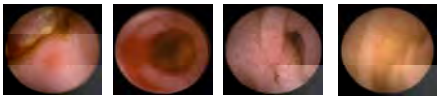
The Feature Structure

ELB 202 (3) 14:40-15:00

Capsule Endoscopy Images Classification by Color Texture and Support Vector Machine

Baopu Li, Max Q.-H. Meng
Department of Electronic Engineering, the Chinese University of Hong Kong

- Capsule endoscopy(CE) is a new technology to diagnose the diseases in digestive tract;
- Computer aided detection for different abnormal image is needed;
- A computerized scheme to discriminate among normal CE images and CE images with three common diseases in digestive tract, i.e., bleeding, ulcer and tumor is proposed;
- Novel color texture features and SVM are employed.



(a) Tumor (b)Bleeding (c)Ulcer (d) Normal

Abnormal CE image and normal one

ELB 202 (4) 15:00-15:20

A Multi-step Curved Lane Detection Algorithm Based on Hyperbola-Pair Model

Jianwen Wang and Xiangjing An
Institute of Automation, National University of Defense Technology
Changsha, China

- The lane markings on the road are represented by a modified hyperbola-pair model, which contains two parts.
- The first one is a parallel straight line model, which is achieved by Hough transform.
- The second one is a hyperbola-pair line model, which is achieved by a searching strategy with the parameters got in the first stage as initial parameters.

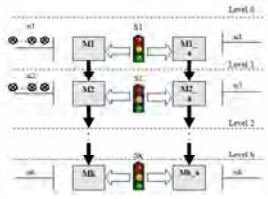
The Result of Lane Detection

ELB 202 (5) 15:20-15:40

Application for manufacturing systems served by collaborative robots monitoring

Eugenia Minca, Otilia Elena Dragomir, Florin Dragomir, Veronica Stefan
Department of Automation, Computer Science and Electrical Engineering, Valahia University of Targoviste
18 Unirii Av., Targoviste, Romania

- An improvement tool, PetriNets type, dedicated to hierarchical recurrent systems modeling.
- Hierarchical levels are interfaced by LIFO module and OOPN.
- This new approach base on temporal hierarchical structure, refined monitoring function modeling.
- The model evolution is made on every horizontal level, until the node where detection is finished, and moves to the next level.



Monoring system representation

MP-2:Robotics II

Session Chair: Hong Zhang and Shuxiang Guo

ELB 205 14:00-15:40 Monday, August 16, 2010

ELB 205 (1) 14:00-14:20

An Experimental Study on Leader-Follower Coalition Method for Solving Multirobot Task Allocation Problems

Jian Chen and Dong Sun
City University of Hong Kong

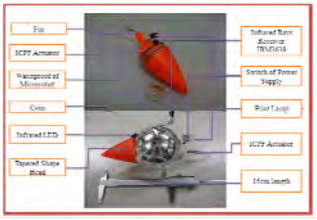
- This paper presents the recent development of a leader-follower coalition based task allocation methodology.
- The resources required by task implementation are utilized in modeling both the robots and the tasks.
- Design of leader selection, coalition forming and coalition evaluation algorithms are presented in the paper.
- Experiments are performed on a group of heterogeneous mobile robots to demonstrate the effectiveness of the proposed approach.

ELB 205 (2) 14:20-14:40

Development of an Infrared Ray Controlled Fish-like Underwater Microrobot

Baofeng Gao and Shuxiang Guo
Kagawa University, Hayashi-cho, Takamatsu, Japan

- We developed a novel fish-like underwater microrobot consists of ICPF actuators, ATMEL AVR control system and Infrared Ray Data Association system.
- We set up experiment to test the possibility of control signals on the ICPF actuator and we use Infrared ray control microrobots, the results show us the possibility and efficiently of coordinated control of group of microrobots.



the Infrared Ray Controlled Fish-like Microrobot

ELB 205 (3) 14:40-15:00

Kinematic Analysis and Solution of the Natural Posture of a 7DOF Humanoid Manipulator

Ye Tian, Xiaopeng Chen, Qiang Huang, *Member, IEEE*, and Weimin Zhang
School of Mechatronical Engineering, Beijing Institute of Technology
Beijing, China

- A 7DOF manipulator with the same joint configuration as human's arm and its planning algorithm is proposed.
- The arm imitates the posture of human's arm to make our manipulator look natural.
- The redundancy is solved and the manipulator's natural posture is derived conveniently and easily.

BHR

ELB 205 (4) 15:00-15:20

Bilateral Control for Omnidirectional Bending Motion of the DSD Forceps Teleoperation System with Time Varying Delay

Hiroyuki Mikami, Yosuke Nishitani and Mitsutaka Hikita
Department of Mechanical Engineering, Kogakuin University, Tokyo, Japan
Chiharu Ishii
Department of Mechanical Engineering, Hosei University, Tokyo, Japan
Hiroshi Hashimoto
Master's Program of Innovation for Design and Engineering,
Advanced Institute of Industrial Technology, Tokyo, Japan

- A bilateral control that guarantees stability of the teleoperation system in the presence of time varying delay was proposed.
- The proposed bilateral control scheme was extended so that it may become applicable to the omnidirectional bending motion of the developed multi-DOF robotic forceps teleoperation system.

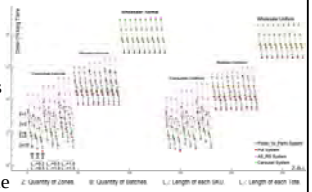
DSD forceps teleoperation system

ELB 205 (5) 15:20-15:40

A Selection Method of Manual and Semi-automated Order Picking Systems based on Filling Curve and Time Model

Changpeng Shen[1], Yaohua Wu[1] and Danyu Zhang[2]
1. The Logistics Institute, School of Control Science and Engineering,Shandong University, Jinan, China
2. The Industrial Engineering Institute, School of Management, Shandong University, Jinan, China

- A method is presented to choose the suitable order picking system for given customer orders.
- A classification of order picking systems including picker-to-parts system, put system and parts-to-picker system.
- Three time models are presented used with filling curves to link the one-dimensional unit grids to get the entire time of two-dimensional system.



Order picking time of each system for different orders

MP-3:Logistics Technology

Session Chair: Changcheng Zhou and Xubing Chen

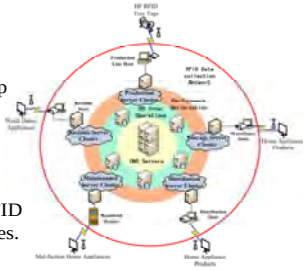
ELB 206 14:00-15:40 Monday, August 16, 2010

ELB 206 (1) 14:00-14:20

RFID Based Production and Distribution Management Systems for Home Appliance Industry

Xubing Chen, Yuhui Wang and Zhouping Yin
School of Mechanical and Electrical Engineering, Wuhan Institute of Technology

- RFID based management methodologies in the life cycle management.
- Combination case of closed-loop and open-loop applications.
- HF RFID tray tags, workstation readers and smart vehicles are employed in factories.
- UHF RFID product tags and RFID gates are used outside of factories.
- Comprehensive tracking and tracing for efficient management.



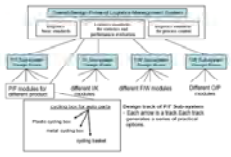
System Integration Diagram

ELB 206 (2) 14:20-14:40

Modularity Design of Logistics Systems

Huishu Piao, Hengfei Wang and Shuangquan Chu
Transportation Management College, Dalian Maritime University
Dalian, Liaoning, China

- The paper studied the logistics standardization from modularity process and modularity value of logistics systems.
- The research result shows that in the era of globalization, the modularity operation of logistics systems is inevitable.
- The governments should bear investment risk of working out logistics standards to make the logistics standards become gradually into perfect, so that "plug and play" types of logistics systems designs are ultimately realized.



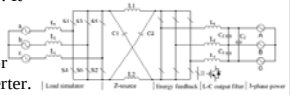
modularity logistics system design path

ELB 206 (3) 14:40-15:00

Z-Source Converter-Based Feedback Type Electronic Load

Xupeng Fang ,Chunjie Li, Zhiqiao Chen and Liangbing Guo
College of Information & Electrical Engineering, Shandong University of Science and Technology, Qingdao, Shandong Province, China

- This paper presents an ac electronic load topology based on Z-source converter. It comprises ac-dc-ac structure and the novel Z-network is also used.
- It has unique features that can boost or buck voltage without a DC-DC converter. It can achieve PFC function, and immune to EMI noise so as to greatly increase reliability.
- Theoretical analysis and MATLAB simulation have been performed to describe and validate the proposed converter.



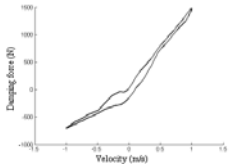
Detail configuration of proposed Z-source AC electronic load

ELB 206 (4) 15:00-15:20

The Optimization Design Method of Throttle Slice Thickness of Telescopic Shock Absorber

Changcheng Zhou[1], Jie Meng[1], and Zhiyun Zheng[2]
1. School of Transport and Vehicle Engineering, Shandong University of Technology Zibo, China
2. College of Information Engineering, Zhengzhou University, Zhengzhou, China

- The general solution of throttle-slice deformation curved surface's differential equation on a linearity non-uniform pressure was given and the deformation analytic formula was established.
- With the superposition principle, the deformation analytic formula of throttle slice on non-uniform pressure was established.
- The results shows that the method of deformation analysis computation of throttle slice on non-uniform pressure is reliable, which has important reference value for throttle slice thickness design and characteristic simulation modeling of shock absorber.



The Characteristic Curve

MP-4:Modeling and Simulation II

Session Chair: Chao Hu and Youfu Li

ELB 207 14:00-15:40 Monday, August 16, 2010

ELB 207 (1) 14:00-14:20

Simulation Research on Hybrid Energy Storage System of Hybrid Electric Vehicle

Duan Jianmin and Xu Min
College of Electronic Information & Control Engineering, Beijing University of Technology
Beijing, China

- The model of hybrid energy storage system (HESS) had been established in matlab/simulink.
- By simulating the pulse power input, a single battery powered HEV had been compared with a HESS supplied HEV in power supply capacity.
- The results showed that the HESS powered hybrid vehicles can reduce high current charge and discharge times of the battery.

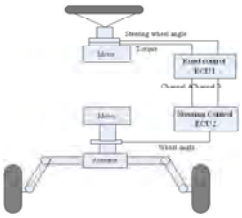
Hybrid energy storage system control strategy block model

ELB 207 (2) 14:20-14:40

Co-Simulation of SBW And FlexRay Bus Based on CANoe_MATLAB

Jianmin Duan, Hualin Deng and Yongchuan Yu
College of Electronic Information & Control Engineering, Beijing University of Technology
Beijing, China

- Build the cosimulation model of steer-by-wire and FlexRay bus on the basis of CANoe_MATLAB
- Steer-by-wire is simulated by Matlab /Simulink, FlexRay bus network is simulated by CANoe, which also verified by the hardware in loop.
- The tests are shown that SBW FlexRay communication between nodes is real time and accurate.



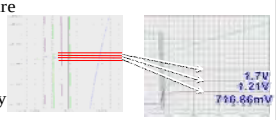
Structure of SBW system

ELB 207 (3) 14:40-15:00

A New Design of Interpolator for Time to Digital Converter

Young-Ho Lee[1], Dae-Wook Kwon[1], Jong-Wan Seo[1], Ki-Min Lee[2], M.H. Baeg[3], Seung-Ho Baeg[3] and Tae-Yong Kuc[4]
1. Department of Electrical and Computer Engineering, SungKyunKwan University, Suwon, Korea
2. LG Innoteck
3. Korea Institute of Industrial Technology
4. School of Information and Communication Engineering, SungKyunKwan University

- We propose an alternative approach for time interpolation of TDC.
- Avoids floating number operation for runtime as well as lowers the temperature variation.
- Reducing the dependency on passive components.
- High repeatability and linearity property within a wide range of operation with high resolution of measurement.
- Practical usage with a simple and low cost implementation.

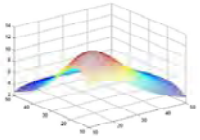


ELB 207 (4) 15:00-15:20

Modeling and Optimization of Isolated Heat Pipe Heat Exchange System Based on Matlab

Yuanfang Zhu, Ruihua Wang and Yating Zhang
College of Electronic Information and Control Engineering, Beijing University of Technology
Beijing, China

- An isolated heat exchange system is added to Beijing Unicom computer room.
- The steady-state model of the heat exchange system is built using mechanism modeling method.
- The optimal operating point of the system is obtained with the help of Matlab optimization toolbox.
- It shows that the design method for solving operational problems of heat exchange system is very effective.



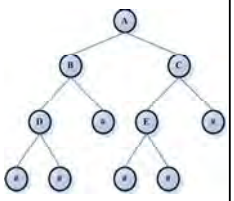
The diagram of the relationship between *EER and f*

ELB 207 (5) 15:20-15:40

Research on the Sequential Bifurcation Applied in Simulation Model of a Simple Supply Chain

Jie Wan, Ya-nan Luo
School of Management, Hebei University of Technology
Tianjin, China

- In this paper, a screening method called Sequential Bifurcation were introduced and applied.
- This technique is both effective and efficient once the assumption of SB is satisfied; that is, it can find the most important factors in simulation experiment, but it needs relatively few simulation runs.
- Finding the most important factor can simplify the process of simulation experiment.
- After using this method in the simulation models of a simple supply chain, it proves that Sequential Bifurcation can correctly and efficiently identify the most important factors in this supply chain.



Tuesday August 17, 2010

Technical Session

TA-1	Automatic Control I
TA-2	Robotics III
TA-3	Process Automation
TA-4	Modeling and Simulation III
TP-1	Automatic Control II
TP-2	Robotics IV
TP-3	Automation and Logistics
TP-4	Modeling and Simulation IV

TA-1:Automatic Control I

Session Chair: Hong Zhang and Shuxiang Guo

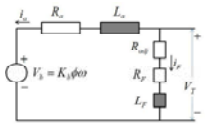
ELB 202 10:20-12:00 Tuesday, August 17, 2010

ELB 202 (1) 10:20-10:44

Global Robust Output Regulation for Nonlinear Systems with iISS Inverse Dynamics

Dabo Xu and Jie Huang
Applied Control and Computing Laboratory, Dept. of Mechanical and Automation Engineering
The Chinese University of Hong Kong, Shatin, N.T., Hong Kong

- This paper develops an approach to dealing with the global robust output regulation problem for a class of Nonlinear systems with integral input-to-state stable(iISS)inverse dynamics by using output feedback control.
- As iISS Condition is strictly weaker than ISS condition, the result of this paper applies to a larger class of nonlinear systems.



A shunt DC motor

ELB 202 (2) 10:44-11:08

System Identification, Modeling and Precision Motion Control of a Linear Motor Drive Stage

Jian Zhang[1], Chuxiong Hu[1], Bin Yao[1,2], Qingfeng Wang[1] and Cong Li[1]
1. State Key Laboratory of Fluid Power Transmission and Control, Zhejiang University, China
2. School of Mechanical Engineering, Purdue University, USA

- This paper studies the system identification, modeling and precision motion control of a coreless linear motor drive stage.
- System identification is carried out to capture the system dynamics.
- An adaptive robust controller is proposed and applied to the linear motor drive stage for good tracking performance under both parametric uncertainties and unknown nonlinearities.

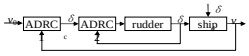
A linear motor stage

ELB 202 (3) 11:08-11:32

Design of Ship Course Controller Based on Fuzzy Adaptive Active Disturbance Rejection Technique

Yingbin Zhou, Weigang PAN, Hairong Xiao
Department of Information Engineering, Shandong Jiaotong University
Jinan, Shandong, China

- An active disturbance rejection nonlinear control strategy is proposed, and the fuzzy controller is used to modify parameters of ADRC online.
- A ship course fuzzy adaptive ADRC controller is designed.
- The simulation results of ship course tracking and keeping show that the controller has good adaptabilities on the system nonlinearity and strong robustness to parameter perturbations of the ship and environmental disturbances.



Double rings ship course controller based on ADRC

ELB 202 (4) 11:32-11:56

Decentralized Control for Small-Scaled Conveyor Modules with Cellular Automata

Tobias Krühn, Sascha Falkenberg, Ludger Overmeyer
Institute of Transport and Automation Technology, Leibniz University
Hannover, Germany

- Small-scaled conveyor modules provide outstanding flexibility
- Connected to a module matrix, a complex, dynamic and target oriented behavior emerges
- Due to a decentralized control, the system is easy to reconfigure and is scalable for large applications

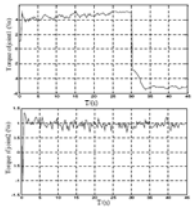
Small-Scaled Conveyor Module

ELB 202 (5) 11:56-12:20

Intelligent Control of Flexible-Joint Manipulator Based on Singular Perturbation

SHAO Zhiyu[1] and ZHANG Xiaodong[2]
1. State Key Laboratory of Explosion Science and Technology, Beijing Institute of Technology, Beijing, China
2. China Academy of Space Technology, Beijing, China

- Intelligent control of space manipulator with flexible-link and flexible-joint is discussed based on the singular perturbation method。
- Singular perturbation method
- Realize precise trajectory tracking and vibration suppression simultaneously for flexible-link/flexible-joint manipulator with payload.
- The performances of the discussed controller are illustrated by the simulation and experimental results.



Output Torque of Flexible Manipulator joint

TA-2:Robotics III

Session Chair: Xuezhang Hou and Biao Zhang

ELB 205 10:20-12:00 Tuesday, August 17, 2010

ELB 205 (1) 10:20-10:44

Mechanical Design and Balance Control of a Humanoid Waist Joint

Wei Xu, Qiang Huang, Jing Li, Zhangguo Yu, Xuechao Chen, Jiayu Liu, and Weimin Zhang
School of Mechatronical Engineering, Beijing Institute of Technology
Beijing, China

- A humanoid waist joint features a large range of motion and high mechanical strength
- A new method of walking pattern generation based on waist joints
- Simulation and walking experiments on BHR

BHR

ELB 205 (2) 10:44-11:08

The Challenges of Integrating an Industrial Robot on a Mobile Platform

Biao Zhang, Carlos Martinez, Jianjun Wang, Thomas Fuhlbrigge, William Eakins, Heping Chen
Corporate Research Center, ABB Inc.
Connecticut, US

- An IRB6620 industrial robot with a tool changer and multiple tools that are installed on a highly customized truck chassis
- The prototype development of such a platform that is self sufficient for electrical power, as well as compressed air from on board sources.
- A mobile platform for an industrial robot which could be used in any location as long it is accessible to the mobile

Industrial Robot on a Mobile Platform

ELB 205 (3) 11:08-11:32

Robotic Leg Control based on Human Motion Analysis and Neural Control Methods

Dorin Popescu*, Cosmin Ionete*, Livia Popescu* and Marian Poboroniuc**
*University of Craiova, **Technical University of Iasi
Romania

- This work presents some results obtained from image processing and motion analysis of the human body.
- The results are implemented on a robotic leg, which was developed in our laboratories.
- A model based neural control strategy is implemented.
- The performances of the implemented control strategies for trajectory tracking are analyzed by computer simulation.

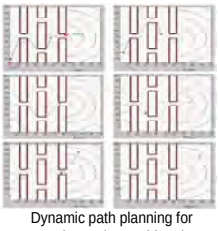
The robotic leg

ELB 205 (4) 11:32-11:56

Level Set and Fat Fast Marching Method for Normal and Dynamic Path Planning of Pursuit-Evasion Problem

Cheng-Yuan Wu and Jing-Sin Liu
Institute of Information Science
Academia Sinica, Taiwan

- FFMM produces a much more accurate path than the path generated by the original FMM.
- FFMM is faster in complicated environments.
- The piecewise result of FFMM is more attractive than the original FMM+ODE in real implementation aspect.
- Achieves dynamic path planning and improves the capture rate by providing the shortest chasing path in every time slot.



Dynamic path planning for pursuit-evasion problem by FFMM.

ELB 205 (5) 11:56-12:20

Robot Finger Design for Myoelectric Prosthetic Hand and Recognition of Finger Motions via Surface EMG

Akitoshi Hadara, Mitsutaka Hikita and Takashi Nakakuki
Department of Mechanical Engineering, Kogakuin University, Tokyo, Japan
Chiharu Ishii
Department of Mechanical Engineering, Hosei University, Tokyo, Japan

- The myoelectric prosthetic hand with two fingers was designed and built.
- Using the neural network, identifier for finger operations based on surface EMG signals was constructed.
- The recognition of each finger operation was performed using the four patterns of the neural network based identifiers, and the results were compared.

Appearance of the built myoelectric prosthetic hand

TA-3:Process Automation

Session Chair: Somashekhar S Hiremath and Yong Yang

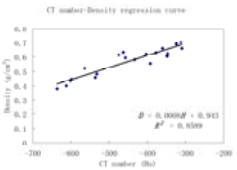
ELB 206 10:20-12:00 Tuesday, August 17, 2010

ELB 206 (1) 10:20-10:44

CT Number in Wood Physical Properties Prediction Based on Computed Tomography Technology

Haiyan Gu[1], Lei Yu[1] and Yong Wang[2]
1. College of Science, Northeast Forestry University, Harbin, China
2. College of Basic Science, Harbin University of Commerce, Harbin, China

- In the paper the range of CT number in different wood tomography slices can be calculated in statistic method.
- Then the parameters of CT window level and window width in wood testing procedure are set to get good visual image.
- The regression curve between CT number and wood density is modeled.
- A method for the nondestructive testing based on computed tomography is provided in wood defect and wood density.



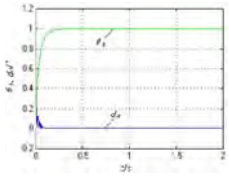
Wood CT number and density regression curve

ELB 206 (2) 10:44-11:08

Coordination Optimization-based Decoupling Control for a Multi-Degree of Freedom Hydraulic System

Yang Yong[1], Wang Zhongsheng[2]
1. Guangdong Univ. Key Lab of Numerical Control Technology, Guangdong Polytechnic Normal University, Guangzhou, China
2. Department of Automation, Guangdong Polytechnic Normal University, Guangzhou, China

- A coordination optimization-based decoupling control has been proposed and applied to a MDOF hydraulic system.
- The proposed control method considers the interaction between two hydraulic actuators.
- The coordination optimization-based decoupling controller combines the merits of decoupling control, coordination-based integral as well as Gaussian coordination optimization.
- The satisfying dynamical and steady-state control performances as well as obvious alleviating interaction effectiveness are obtained.



θ_2 result with the proposed decoupling control

ELB 206 (3) 11:08-11:32

Application of Fault Diagnosis Expert System in Grinding Process

Wei Qin[1], Wenjun Yan[1], Xu Jin[2]
1. College of Electrical Engineering, Zhejiang University
2. Shandong Luneng Engineering Co., LTD

- This paper constructs the fault expert system to guide and optimize the grinding process.
- First, the expert database is established with fuzzy cluster analysis, principal component analysis (PCA) and tendency analysis.
- With support vector machine (SVM) regression, the multiple regression equations of main operation loops are fitted.
- The system gives out adjustment suggestions according to the variation tendency.
- The practical running conditions indicate that this system is effective and credible.

Online Program Flow Chart of Expert System

ELB 206 (4) 11:32-11:56

Self Organizing Sensor Networks for Process Monitoring and Automation

Somashekhar S Hiremath, Gokul Balakrishnan
Mechanical Engineering, Indian Institute of Technology, India

- **Goals**
  - Parameter acquisition and monitoring in production environments
  - Increase of productivity and reliability and Reduction of energy consumption
- **Means**
  - Self-organizing sensor networks (wired and wireless, Ad-hoc)
  - Software tools for efficient programming
  - Energy self-sustaining systems

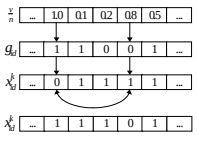
Software Architecture

ELB 206 (5) 11:56-12:20

PAPR Reduction with Phase Factors Suboptimization for OFDM Systems

Jing Gao, Jinkuan Wang, Bin Wang
School of Information Science & Engineering, Northeastern University
Shenyang, China

- Partial transmit sequence (PTS) is an effective technique to reduce the peak-to-average power ratio (PAPR) for orthogonal frequency division multiplexing (OFDM) transmitter.
- An improved particle swarm optimization (PSO) based PTS algorithm is proposed to reduce the complexity by choosing the weighting factors suboptimally.
- The evaluation shows that the proposed algorithm performs very closely to the optimal PTS in many cases with much lower complexity.



Particle Position Update Figure

TA-4:Modeling and Simulation III

Session Chair: Shiwang Hou and Michael Decker

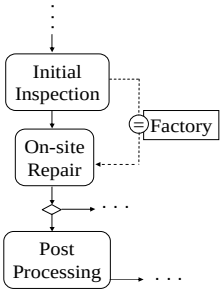
ELB 207 10:20-12:00 Tuesday, August 17, 2010

ELB 207 (1) 10:20-10:44

Anomalies In Business Process Models For Mobile Scenarios With Location Constraints

Haiying Che and Michael Decker
School of Software, Beijing Institute of Technology (BIT)
Beijing, China

- We propose an extension to *UML Activity Diagrams* to express *Location Constraint*
- This approach is exemplified by a scenario from the domain of logistics, namely relocation
- We also consider different types of anomalies that might occur when using location constraints

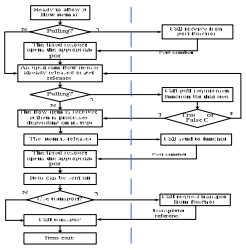


ELB 207 (2) 10:44-11:08

Study on Logistics Simulating and Optimizing of Distribution Center

HOU Shiwang
School of Mechanical Engineering & Automatization, North University of China Research
Taiyuan, China

- Reasonable simulation goal, proper system modeling and correct simulation executing procedure is the precondition for reliable result.
- Taking a typical DC as an example, this paper developed a simulation model with Flexsim software.
- Experimented with the model to observe the effect different scenarios may have on the behavior of the model.
- The result illustrate that the highest profit is triple more than the lowest.



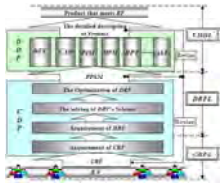
Simulating procedure of DC model

ELB 207 (3) 11:08-11:32

Function Flow-based Product Design Process Modeling

Shuxia Li[1,3], Hongbo Shan[2,3]
1. School of Business, East China University of Science & Technology, China
2. College of Mechanical Engineering, Donghua University , China
3. University of Michigan, USA

- The purpose of this research is to develop a systematic product design process model based on requirement.
- The definition of requirement, function and requirement function are given and the mutual relationship among them is analyzed.
- An integration mode of product design process is proposed. Furthermore, a new function flow-based product design process model is presented.
- This product design process modeling method can help transferring different type of requirement functions effectively.



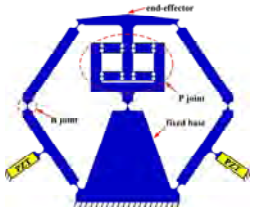
The PDP based on function transformation flow

ELB 207 (4) 11:32-11:56

Analysis of a Novel 2-DOF Flexure Hinge-based Parallel Micromanipulator in a Polar Coordinate System

Jiming Huang[1] and Yangmin Li[1, 2]
1. Department of Electromechanical Engineering, University of Macau
2. School of Mechanical Engineering, Tianjin University of Technology

- A novel 2-DOF compliant parallel micromanipulator is proposed.
- Flexure hinges are employed and PZT is utilized as actuating device.
- The kinematics and statics are studied based on PRB model and validated by FEA, the workspace is determined.
- Be expected to carry out manipulation tasks in polar coordinate systems, e.g. micro-injection, micro-positioning.



A 2-DOF Micromanipulator

TP-1:Automatic Control II

Session Chair: Li Zhai and Anmin Zhu

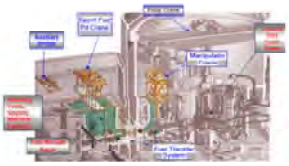
ELB 202 14:00-15:40 Tuesday, August 17, 2010

ELB 202 (1) 14:00-14:20

The Design and Realization of Control System for Nuclear Fuel Transfer System

Yu Fang, A peng Zhao, Fengqi Wu, etc
China Nuclear Power Technology Research Institute
Shen zhen, China

- A distributed control system with two levels of hardware controllers and module hierarchical software architecture are proposed to meet the demand of the FTS.



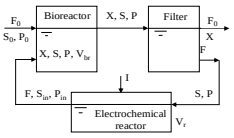
- A practical control method which the PID parameters can change with the external loads and different zones is realized.

ELB 202 (2) 14:20-14:40

Adaptive Control of a Time Delay Bio-eletrochemical Process Using Neural Networks

Emil Petre, Dan Selisteanu and Dorin Sendrescu
Department of Automatic Control, University of Craiova, Craiova, Romania

- A nonlinear neural adaptive control strategy for a wastewater treatment bioprocess is designed
- In fact, a direct adaptive controller based on a radial basis function neural network and on an I/O feedback linearization technique is developed
- The control method is applied to a complex bioprocess - an association of a recycling bioreactor with an electrochemical reactor



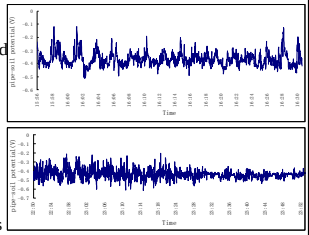
Schematic view of bioelectrochemical process

ELB 202 (3) 14:40-15:00

Application of a stray current monitoring system base upon virtual instrument

Zhi-guang Chen, Chao-kui Qin, Yang-jun Zhang and Xian-chao Yang
College of Mechanical Engineering, University of Tongji
Shanghai, China

- The reason and character of stray current from DC electric traction systems and its influence upon buried pipe were introduced.
- A new system for monitoring the stray current, based upon virtual instrument, was put forward.
- The pipe-soil potentials of a gas pipeline, located in the neighboring area and parallel to the rail transit in Shanghai, were tested. Actual results show that stray current corrosion is existed.



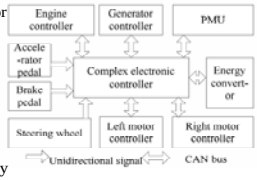
The pipe-soil potential changes vs time

ELB 202 (4) 15:00-15:20

On Steering Regenerative Brake Torque Control of Dual-Motor Drive for Electric Tracked Vehicle

Zhai Li and Pan Yongchuan
Department of mechanical and vehicular Engineering,University of Beijing Institute of Technology
Beijing, China

- Researches on the steering regenerative brake torque control of dual-motor drive for electric tracked vehicle.
- Steering dynamic model of tracked vehicle was made up, steering regenerative brake torque control strategy of induction motor based on rotor flux oriented and complex speed-torque control method of steering regenerative braking of dual-motor were proposed, and energy feedback produced by steering regenerative braking was discussed.
- Experimental results of dual-motor drive characteristic show that stepless smooth steering is achieved.



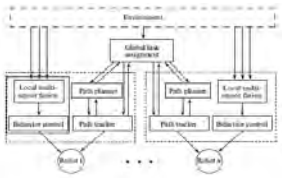
Complex control of two motors brake torque

ELB 202 (5) 15:20-15:40

A Framework for Coordination and Navigation of Multi-Robot Systems

Anmin Zhu and Simon X. Yang
School of Computer and Software, Shenzhen University, China
ARIS Lab, School of Engineering, University of Guelph, Canada

- A framework is proposed to incorporate task assignment, path planning, and tracking control of a multi-robot system.
- A SOM-based algorithm to tackle the task assignment problem for multi-robots.
- A neuro-dynamics algorithm for real-time path planning with obstacle avoidance.
- A neuro-dynamics and back-stepping based model for real-time path tracking control.



The framework

TP-2:Robotics IV

Session Chair: Guangming Song and Xuezhang Hou

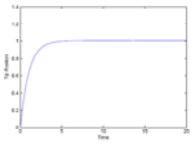
ELB 205 14:00-15:40 Tuesday, August 17, 2010

ELB 205 (1) 14:00-14:20

A Variable Structure Control for a Flexible Euler-Bernoulli Beam

Xuezhang Hou[1] and Xiaoning Lin[2]
1. *Mathematics Department, Towson University, Baltimore, Maryland , USA*
2. *School of Business, Northeast Normal University, Changchun,P.R.China*

- In this paper, the variable structure control for a Flexible Euler-Bernoulli Beam formulated by partial differential equations with initial and boundary conditions is investigated by means of semigroup of linear operators and spectral analysis.
- The evolution equations for the system in the appropriate Hilbert spaces are established.
- A variable structure control is designed and studied for the beam system.
- It is shown that the beam system with designed variable structure control is asymptotically stable.



Response to a step input for variable structure control

ELB 205 (2) 14:20-14:40

A Reconfigurable Mobile Sensor Network System for Rough Terrain

Guangming Song, Xiaofeng Ye, Yanpeng Niu and Hui Wang
School of Instrument Science and Engineering, Southeast University
Nanjing, China

- The proposed system is composed of modular robotic nodes that can be physically connected and disconnected to transform into various configurations.
- The assembly can split into individual modules to deploy themselves when they reach the destination.
- They can adapt to changing terrain conditions in real-world applications.

The Reconfigurable MSN

ELB 205 (3) 14:40-15:00

Design and Experiment of an Open Control System for a Humanoid Robot

Xuechao Chen, Qiang Huang, Zhangguo Yu, Jing Li, Wei Xu, Fei Meng, and Jiayu Liu
Intelligent Robotics Institute, Beijing Institute of Technology
Beijing, China

- An open control system for a humanoid robot supporting CANopen protocol
- Communication time is reduced effectively via multiple CAN channels in parallel mode
- Drivers and Mini Multi-Axis Controllers are designed in compliance with DS301

BHR

ELB 205 (4) 15:00-15:20

Path Planning for Space Robots: Based on Knowledge Extrapolation and Risk Factors

Venkateswaran Nagarajan and Prahasaran raja Asokan
WAran Research FoundaTion(WARFT)
Chennai,India.

- Space robot navigation and the hazards involved in it
- Integration of Knowledge extrapolation with the existing path planning algorithms
- Knowledge bank and Bayesian probability
- Integration of Risk factors and Knowledge extrapolation

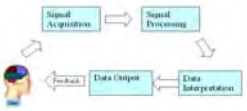
Integration of Knowledge extrapolation

ELB 205 (5) 15:20-15:40

Review of the Commercial Brain-Computer Interface Technology from Perspective of Industrial Robotics

Biao Zhang, Jianjun Wang and Thomas
Corporate Research Center, ABB Inc.
Connecticut, US

- Summarizes the recent progress of brain-computer interface technologies from industrial robotics perspective
- The evaluation of the new BCI commercial products.
- The potential applications of non-invasive commercial brain-computer interfaces to industrial robot



The architecture of general BCI

TP-3:Automation and Logistics

Session Chair: Hong Zhang and Yunhui Liu

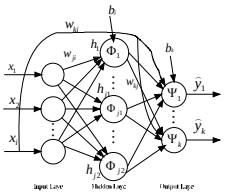
ELB 206 14:00-15:40 Tuesday, August 17, 2010

ELB 206 (1) 14:00-14:20

Multiple-Prior-Knowledge Neural Network for Industrial Processes

Lou Haichuan, Su Hongye, Xie Lei ,Gu Yong, Rong Gang
Institute of Cyber-Systems and Control ,Zhejiang University, China

- A novel multiple-prior-knowledge neural network for industrial processes is proposed.
- Diversity of priori knowledge from industrial processes are discovered and embedded into three-layer hybrid feed forward neural network.
- Sequential quadratic programming method is selected as the network learning algorithm.
- Its effective performance is validated with the modelling of a nonlinear process of Continuous-stirred tank reactor.



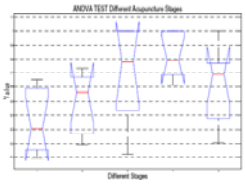
Multiple-Prior-Knowledge neural network structure

ELB 206 (2) 14:20-14:40

Analysis of EEG Signals during Acupuncture Using Spectral Analysis Techniques

Nuo Li[1] , Y. K. Wong[2], W.L.Chan[2] and K. M. Tsang[2]
1. School of Electrical Engineering and Automation, Tianjin University, P. R. China
2. Department of Electrical Engineering, Hong Kong Polytechnic University, Kowloon, Hong Kong

- Welch method was used to process the signals.
- The main objective is to find the effect of acupuncture on brain.
- A protocol composed of three different manipulations has been designed to acquire the EEG signals using 22 biosensors.
- ANOVA test was adopt to reveal the differences.
- At last, an apparent phenomenon was found in the study.



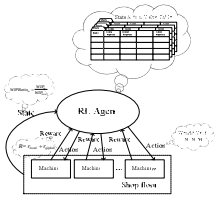
The ANOVA test of Different Acupuncture Stages

ELB 206 (3) 14:40-15:00

Rule Driven Multi Objective Dynamic Scheduling by DEA and RL

XiLi Chen, XinChang Hao, Hao Wen Lin, and Tomohiro Murata
IPS, Waseda University
Kitakyushu, Japan

- A rule driven dispatching method based on Data Envelopment Analysis and Reinforcement Learning is proposed for multi objective dynamic scheduling.
- Implementation of the proposed method in a two-objective dynamic job shop scheduling is demonstrated and the results are satisfactory.



Reinforcement Learning scheme

ELB 206 (4) 15:00-15:20

Condition Monitoring in Intralogistic Systems by the Utilization of Mobile Measurement Units

Bernd Künne, Jan Eggert, Stefan Czarnetzki
Faculty of Mechanical Engineering and Robotics Research Institute
TU Dortmund University, Germany

- Monitoring of the condition of intralogistic systems.
- Distribution of stationary and mobile sensor units.
- Mobile measurement unit detects disturbances and potential failure areas.
- Development of a robust algorithm to localize the measurement unit on the conveying system and map disturbances.

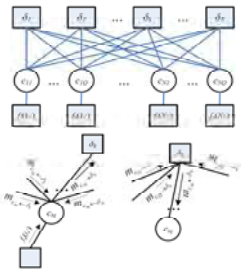
Mobile Measurement Unit

ELB 206 (5) 15:20-15:40

Facility Locations Revisited: An Efficient Belief Propagation Approach

Wenye Li (MPI), Linli Xu (USTC), and Dale Schuurmans (U.Alberta)

- A BP-based Approach to Facility Location Problems
- Fundamentally Different from Previous Methods
- Equivalent with State-of-the-art Solutions in Accuracy
- Magnitudes of Improvement in Running Speed!!!



TP-4:Modeling and Simulation IV

Session Chair: Yangmin Li and Baopu Li

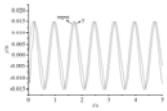
ELB 207 14:00-15:40 Tuesday, August 17, 2010

ELB 207 (1) 14:00-14:20

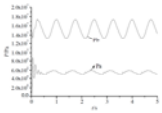
Research of the influence factors of the accumulator fast forging hydraulic control system

Qian Ma, Xiangdong Kong, Jing Yao
Heavy Machinary Fluid Power Transmission and Control Key Laboratory
Hebei Yanshan University, Qinhuangdao, China

- In this paper, we found the mathematical model of fast forging system and do simulation study, analyze the forging displacement curve, master cylinder pressure and draw back cylinder pressure under different trip, different initial pressure.
- It has provided the theory basis for accumulator selection of the fast forging system.



Displacement curve



Pressure curve

ELB 207 (2) 14:20-14:40

Pre-Processing for Missing Data: A Hybrid Approach to Air Pollution Prediction in Macau

Kin Seng Lei, Feng Wan
Department of Electrical and Electronics Engineering
Faculty of Science and Technology, University of Macau, Macau SAR, China

- A method for pre-processing the missing observed data by adopting the multiple imputation technique for Macau API prediction using the Adaptive Neuro-Fuzzy Inference System (ANFIS).
- The forecasting performance after missing data pre-processing is compared with the conventional case without pre-processing.
- The results in terms of the root mean square error (RMSE) shows effectiveness in API forecasting against nine-years measured data in the Macau city.

The Macau City

ELB 207 (3) 14:40-15:00

Research on Flow Simulation of Fuel Systems Based on Components

Li Liu[1], Jie Lian[1], Yuying Zhou[2], Hao Chen[2]
1. School of Automation Science and Electrical Engineering, Beihang University, Beijing, China
2. System Engineering Research Institute, Beijing, China

- Using ActiveX control we encapsulate 7 kinds of device models into reusable visual component.
- A ship fuel-system simulation platform is developed by using component technology and depth-first search algorithm.
- Using the fuel simulation system, the operational flow analysis and assistant decision-making can be done intuitionist, convenient and fast.

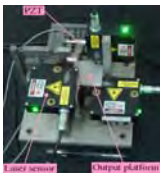
Operational Flow Analysis Simulation

ELB 207 (4) 15:00-15:20

Sliding Mode Control of a Piezo-Driven Micropositioning System Using Extended Kalman Filter

Qingsong Xu and Yangmin Li
Department of Electromechanical Engineering, University of Macau
Macao SAR, China

- The controller is constructed based on the dynamic model with Bouc-Wen type of hysteresis.
- A sliding mode control with perturbation estimation using an extended Kalman filter is proposed for the motion tracking control of a micropositioning system.
- The control scheme is demonstrated by experimental studies on an XYZ micropositioning stage prototype.



The XYZ Stage

Wednesday August 18, 2010

Technical Session

WA-1	Control and Automation I
WA-2	Robotics V
WA-3	Evaluation and Optimization
WA-4	Modeling and Simulation V
WP-1	Control and Automation II
WP-2	Biomedical Instrumentation
WP-3	Planning and Scheduling I
WP-4	Network-based Systems
WE-1	Control and Automation III
WE-2	Instrumentation Systems
WE-3	Planning and Scheduling II

WA-1:Control and Automation I

Session Chair: Yutian Liu and Xiangzhong Meng

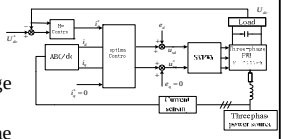
ELB 202 10:20-12:00 Wednesday, August 18, 2010

ELB 202 (1) 10:20-10:44

Design of Mixed H∞ and Optimal Controller for Three-Phase PWM Rectifiers

Hui Zhang[1] , Guojun Tan[1] , Minglian Zhang[2] and Ruiwen Yu[1]
1. School of Information and Electrical Engineering, China University of Mining and Technology, Xuzhou, China
2. Department of Aviation Four Stations, Xuzhou Air Force College, Xuzhou, China

- This paper presents a linear quadratic regulator (LQR) for the inner current loop control without decoupling, and a robust H∞ control method for the outer voltage loop.
- The simulation results show that the designed controller can achieve unit power factor control, and has faster response and better external disturbance rejection capabilities compared with the conventional PI controller.



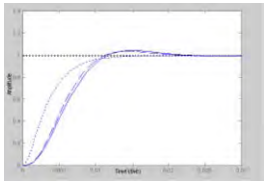
Proposed control system

ELB 202 (2) 10:44-11:08

Robust Predictive Control for Nonlinear Uncertain Systems with Time-delay

Yanjun Zhang and Shuo Zhou
College of Automation&Electronic Engineering, Qingdao University of Science & Technology
Qingdao , China

- In this paper, based on previous research for nonlinear uncertain time-delay system, combined with Lyapunov stability theorem, we can get the sufficient conditions of the system asymptotically stable and the state feedback ∞ H controller, and give a class of nonlinear uncertain systems with robust state feedback ∞ H control law design.
- Finally, a numerical simulation shows the effectiveness of the design scheme.



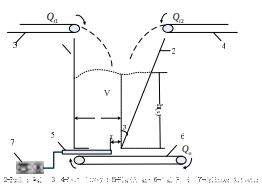
Comparison of the effects of various robust controller

ELB 202 (3) 11:08-11:32

Multi-information Fuzzy Controller Design of Coal Feeder with Banker

Xiangzhong Meng , Xiangliang Meng , Hongtao Chen
College of Automation and Electronic Engineering, Qingdao University of Science and Technology, Qingdao, China

- A fuzzy control method based on information weighted fusion is applied in the system of coal feeder with banker.
- It assures the easy realization and strong stability and anti-interference.
- Simulation results indicates good characteristic of this method.



Physical model of coal feeder with bunker

ELB 202 (4) 11:32-11:56

Fault Diagnosis and Fault Tolerant Control of Nonlinear Systems

Yutian Liu, Changgang Li, Junjie HU
Faculty of Electronic and Information Engineering, Zhejiang Wanli University
Ningbo, Zhejiang, China

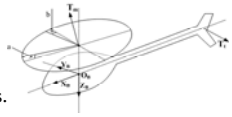
- A survey of fault diagnosis and fault tolerant control techniques for nonlinear systems is presented.
- Firstly, the model of general nonlinear systems is introduced.
- Main approaches for fault diagnosis and fault tolerant control of nonlinear systems, including sliding mode observers based fault detection, unknown input observer based fault diagnosis, nonlinear observer based fault tolerant control.
- Finally, the main challenges, difficulties and some future development trends for the field are pointed out.

ELB 202 (5) 11:56-12:20

Adaptive Fuzzy Backstepping Control for a Miniature Helicopter

Guanqing Chang, Hanbo Qian, Guoliang Fan, and Hongxing Chang
Insitute of Automation, Chinese Academy of Sciences
Beijing, China

- This paper presents an adaptive control approach for a miniature helicopter based on combining backstepping design and adaptive fuzzy control.
- Firstly, the adaptive Takagi-Sugeno fuzzy systems are employed to compensate for the effect of helicopter uncertain dynamics.
- Secondly, backstepping design is adopted to accomplish the controller design.
- Simulation results verify the good perfomance and robustness of the proposed control approach.



Helicopter Schematic Diagram

WA-2:Robotics V

Session Chair: Xuechao Chen and Xin Song

ELB 205 10:20-12:00 Wednesday, August 18, 2010

ELB 205 (1) 10:20-10:44

3D Scenes Registration using a 2D Laser Range Finder

N. J. Chen and J. S. Chen
Department of Power Mechanical Engineering,National Tsing-Hua University
Hsinchu, Taiwan, R.O.C.

- A 3D volumetric representation of environments for the Simultaneous Localization and Mapping (SLAM) with a 2D Laser Range Finder, augmented with an additional self-integrated servomechanism was devised.
- We proposed an effective edge feature extraction method to extract the edge points and reduce the redundant points in a 3D scene.
- Experiment results have shown its efficiency.

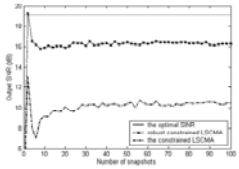
A mobile robot PME3D-1

ELB 205 (2) 10:44-11:08

Robust LSCMA under Quadratic Constraint

Xin Song Jinkuan Wang , Yinghua Han
Engineering Optimization and Smart Antenna Institute,Northeastern University
Qinhuangdao, China

- The proposed algorithm is based on explicit modeling of uncertainties in the desired signal array response
- To decrease computation complexity, the weight vector is obtained by partial Taylor-series expansion
- It provides an improved robustness against mismatches



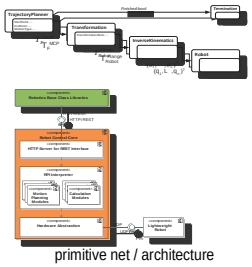
Output SINR versus N

ELB 205 (3) 11:08-11:32

Interfacing Industrial Robots using Realtime Primitives

Michael Vistein, Andreas Angerer, Alwin Hoffmann, Andreas Schierl, and Wolfgang Reif
Institute for Software and Systems Engineering, University of Augsburg
Augsburg, Germany

- Classical robot programming languages are often rather inflexible for extensions for robot cooperation or sensor integration
- Realtime Primitives Interface (RPI) offers a generic interface for high level programming languages to generate real-time capable robot tasks
- Dataflow based description of tasks allows deterministic execution



primitive net / architecture

ELB 205 (4) 11:32-11:56

A Practical Approach for Recognition of Hand Gesture and Distinction of Its Singularity

Yusuke Nakaya, Takashi Nakakuki, and Mitsutaka Hikita
Dept. of Mechanical Engineering, Kogakuin University, Tokyo, Japan
Chiharu Ishii
Dept. of Mechanical Engineering, Hosei University, Tokyo, Japan

- A gesture recognition method was proposed using the surface EMG signals.
- Based on the surface EMG signals, a novel distinction method of the singularity such as the peculiarity or the inexpertness of the unskilled operator was proposed.
- Recognition of 6 kinds of hand gestures was carried out.
- Distinction of the singularity based on the difference in operation speed was carried out.

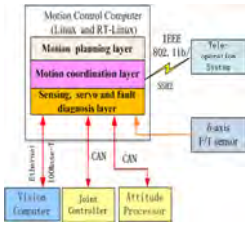
Targeted 6 hand gestures, assignment of surface electrodes and their signals

ELB 205 (5) 11:56-12:20

Controller Design and Real-time Fault Diagnosis for a Humanoid Robot

Xingzhong Wang[1,2] , Zhangguo Yu[3], Xuechao Chen[3]
1. School of power and mechanical engineering, Wuhan University
2. Institute of Information system, China Development and Design Center
3. Intelligent Robotics Institute, Beijing Institute of Technology

- A new distributed controller for humanoid robots based on Ethernet and CAN bus was proposed.
- A real-time fault diagnosis method is proposed to observe the faults of the humanoid robot.
- The effectiveness of the designed controller and fault diagnosis was confirmed by experiments.



WA-3:Evaluation and Optimization

Session Chair: Baopu Li and Lei Chen

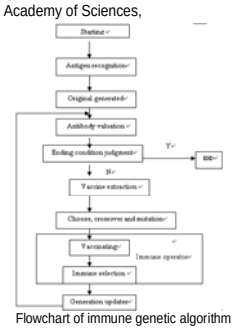
ELB 206 10:20-12:00 Wednesday, August 18, 2010

ELB 206 (1) 10:20-10:44

Immune Genetic Algorithm for Flexible Job-shop Scheduling Problem

Jia Ma , Yunlong Zhu , Gang Shi
Shenyang Institute of Automation , Chinese Academy of Sciences,
Shenyang, China

- This paper is put forward an improved immune genetic algorithm (IGA) through the introduction of immune operator.
- Abstract vaccine、vaccination and Immune selection .
- The paper applies IGA to solving the flexible job-shop scheduling problem and verifies the validity and stability.



Flowchart of immune genetic algorithm

ELB 206 (2) 10:44-11:08

Coordination Analysis between Liaoning province Port and Shipping Industry and Economic Society based on DEA

Ge Liu, Yan Chen, Shilong Qi
College of Transportation Management, Dalian Maritime University
Dalian, China

- This article selects the port and shipping system and economic society system between the years 1996 and 2008 as the Decision Making Units and adopts the DEA model to analysis the data of the input and output of the two systems.
- The result shows that harmonious level of the two systems is fluctuated, only in 2003 which are relatively valid.
- Hence the government should be responsible for coordinating with relevant departments to ensure the effective running of the two systems.

ELB 206 (3) 11:08-11:32

Research to Optimize the Embodiment Design of Modules and Components Used in Roller Conveyors

Bernd Künne and Dorothee Wieczorek
Department of Machine Elements, TU Dortmund University
Dortmund, Germany

- Design of roller conveyors is not adapted to customer requirements.
- Development of statistical models with the help of DoE.
- Optimisation of the response variables.
- Example how designing roller conveyor modules with this method.

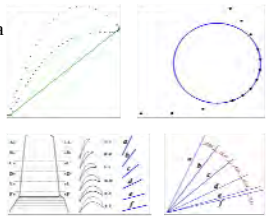
Roller Conveyor (TGW)

ELB 206 (4) 11:32-11:56

Parameter extraction of featured section in turbine blade inspection

Lei Chen, Bing Li, Zhuangde Jiang, Jianjun Ding and Fei Zhang
State Key Laboratory for Manufacturing Systems Engineering, Xi'an Jiaotong University
Xi'an, China

- The inspection of free-form shaped turbine blade in turbomachinery is a very critical and tough work.
- Based on the parameter evaluation idea, the aim of this study is to develop methods for extracting key parameters of a turbine blade.
- New extraction methods of several section parameters are presented in this paper, including chord length, leading/trailing edge and twist of airfoil surface.



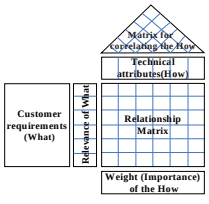
Parameters Extraction

ELB 206 (5) 11:56-12:20

A Fuzzy-QFD Approach to Design Decision Support System for Emergency Response of Hazardous Materials Road Transportation Accidents

Yan Yuanchun[1], ZHANG Yong[2], ZHOU Zhuping[2]， LIU Haoxue[1]
[1] School of Automobile, Chang'an University, Xi'an, China
[2] School of Transportation, Southeast University, Nanjing, China

- Developed a decision support system (DSS) to improve emergency response ability of hazardous materials road transportation accidents.
- Proposed a framework based on quality function deployment (QFD) method to design DSS scheme selection.
- Applied the method based on QFD to lead the user's requirements into technical attributes of DSS design and design scheme evaluation.
- A real case was given to illustrate the feasibility of the proposed method.



House of quality

WA-4:Modeling and Simulation V

Session Chair: Timo R.Nyberg and Yue Zhao

ELB 207 10:20-12:00 Wednesday, August 18, 2010

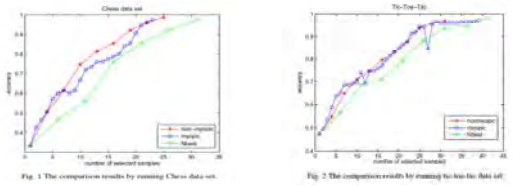
ELB 207 (1) 10:20-10:44

Non-myopic Active Learning with Mutual Information

Yue Zhao
Department of Automation
Minzu University of China
Beijing,100081, China
zhaoyuecs@mail.edu.cn

Qiang Ji
Department of Electronical,Computer,and System Engineering
Rensselaer Polytechnic Institute
Troy, New York 12180, USA
qji@ecse.rpi.edu

- In this paper, a non-myopic active learning algorithm is presented based on mutual information. Our algorithm selects a set of samples at each iteration, and the objective function of the algorithm is proved to be submodular, which guarantees to find the near-optimal solution. Our experimental results on UCI data sets show that the proposed algorithm outperforms myopic active learning.

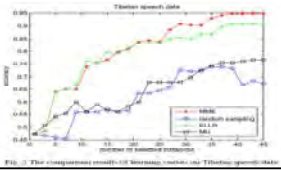


ELB 207 (2) 10:44-11:08

Fast Construction of Speech Recognition Model Based on Sample Selection Strategy

Xinqin Pan, Yue Zhao and Yongcun Cao
Department of Automation
Minzu University of China
Beijing,100081, China
sandycode@163.com

For fast building the speech recognition models in some industrial applications, we present a novel sample selection strategy that can use very few labeled speech utterances to construct the effective recognition model. The experimental results show that our approach has better performance than state-of-the-art methods and passive learning, and has enough robust to be accepted in the worse case of building speech recognition models.

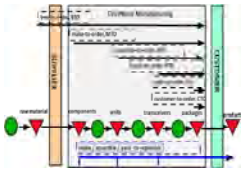


ELB 207 (3) 11:08-11:32

Mass Customization Manufacturing Solution for Cell Phone Production

Gang XIONG[1], Dong FAN[1], Shen LIU[1], Timo R. NYBERG[2], Fei-yue WANG[1]
1. The Key Laboratory of Complex System Intelligent Science, Institute of Automation, Chinese Academy of Sciences, Beijing, China
2. BIT Research Centre, Aalto University, FI-00076 Aalto, Finland

- This paper mainly proposes a kind of mass customization manufacturing solution, which has been applied into cell phone production successfully.
- Firstly, the cell phone production process is introduced.
- Then, the solution's production modes, the order processing, and MES architecture, are described.
- The results of mass customization, especially on the order and quality, are given out.
- Finally, conclusions are drawn out.



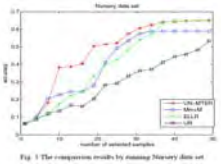
Customized manufacturing modes of cell phone

ELB 207 (4) 11:32-11:56

An Active Learning Method under Very Limited Initial Labeled Data

Yue Zhao[1] and Qiang Ji[2]
1. Department of Automation, Minzu University of China, Beijing,China
2. Department of Electronical,Computer,and System Engineering, Rensselaer Polytechnic InstituteBeijing,Troy, New York, USA

- In this paper, we introduce a new nonparametric active learning strategy that can perform well even under very limited initial training data
- The experimental results with benchmark datasets show that our method outperforms state of the art methods especially when the amount of the initially labeled data is small or when the quality of the initially labeled data is poor.



The comparison results by running Nursery data set

WP-1:Control and Automation II

Session Chair: Simon Yang and Xingyu Jiang

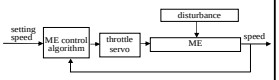
ELB 202 14:00-15:40 Wednesday, August 18, 2010

ELB 202 (1) 14:00-14:20

Design of Ship Main Engine Speed Controller Based on Optimal Active Disturbance Rejection Technique

Weigang PAN[1], Yingbin Zhou[1],Hairong Xiao[1],Yanzhen Han[1] and Changshun Wang[1]
1.Department of Information Engineering, Shandong Jiaotong University, Jinan, China

- An active disturbance rejection nonlinear control strategy is proposed, and the genetic algorithm is used to modify parameters of ADRC online.
- A ship main engine optimal ADRC controller is designed.
- The simulation results show that the controller has good adaptabilities on the system nonlinearity and strong robustness to parameter perturbations of the ship and environmental disturbances. And the speed switching is fast and smooth.



ME Block diagram of speed control system

ELB 202 (2) 14:20-14:40

H∞ Direct Adaptive Fuzzy Control with Unknown Control Gain for Uncertain Nonlinear Systems

Yongping Pan, Daoping Huang and Zonghai Sun
School of Automation Science and Engineering, South China University of Technology, Guangzhou, China

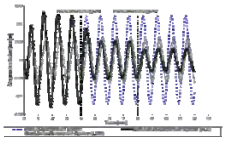
- A H∞ direct adaptive fuzzy controller for uncertain affine nonlinear systems under external disturbance is proposed.
- A conventional fuzzy logic system (FLS) is used to approximate the control gain function, a variable universe FLS is used to approximate a ideal controller.
- The key assumption is that the total approximation error is bounded.
- It is proved that the closed-loop system not only is stable in sense that all variables are bounded, but also achieves the tracking performance and the tracking error convergence.

ELB 202 (3) 14:40-15:00

FPGA Based Real-Time Adaptive Fuzzy Logic Controller

Aws Abu-Khudhair, Radu Muresan, and Simon X. Yang
School of Engineering, University of Guelph
Guelph, Ontario, Canada

- The paper presents an FPGA based real-time adaptive FLC.
- The proposed controller is able to adapt new control parameters within the control cycle, in real-time.
- The implementation required only 40% of the area available on a Virtex II FPGA.
- Implementation is performed using the National Instruments real-time, and FPGA modules.



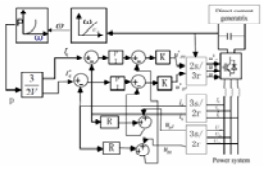
Vehicle suspension deflection simulation result

ELB 202 (4) 15:00-15:20

Research on the Optimal Control Method of Wind and Electric Energy Conversion

Wei Wei and Peng Xue
College of Electrical and Electronic Engineering, Changchun University of Technology
Changchun, China

- With the method of coordinate transformation, the output power is decomposed into active component and reactive component.
- An optimal control system of wind and electric energy conversion is established.
- Prediction and adjustment and control of revolving speed.
- The experimental simulation proves that the control strategy put forward is simple and effective.



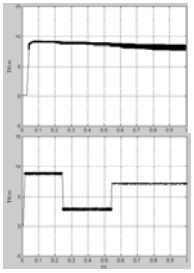
Optimal track control system of wind energy

ELB 202 (5) 15:20-15:40

A Research on Direct Torque Control Method in View of Space Voltage Vector

Peng Xue and Wei Wei
College of Electrical and Electronic Engineering, Changchun University of Technology
Changchun, China

- Multiple vector synthesis and mutual switch control of motor air-gap flux according to speed variation.
- Control mode of hexagon flux linkage and polygon flux linkage in detail.
- Implementation process of rotor flux observation and choosing switch state based on flux tolerance.
- Restrain the pulsation issues of magnetic torque and stator flux linkage at electrical machine's low speed more effectively than hexagon flux linkage direct torque control.
- Good dynamic and static performance.



Torque waveform

WP-2:Biomedical Instrumentation

Session Chair: Chao Hu and Jingsheng Liao

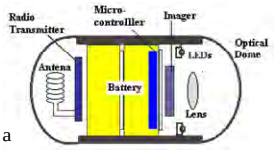
ELB 205 14:00-15:40 Wednesday, August 18, 2010

ELB 205 (1) 14:00-14:20

A Novel Wireless Capsule Endoscope With JPEG Compression Engine

Chang Cheng[1], Zhiyong Liu[1], Chao Hu[1], and Max Q.-H. Meng[2]
1. Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences, Shenzhen, China
2. Department of Electronic Engineering, The Chinese University of Hong Kong, Hong Kong, China

- Improve the quality of images collected by the wireless capsule endoscope (WCE) .
- Decrease the system energy consumption.
- Integrate a CMOS sensor with an optional JPEG compression engine, a low power consumption high-performance micro-controller and an ultra low power RF transceiver in a small capsule (less than 10mm×25mm).



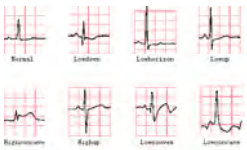
Structure diagram of a novel WCE

ELB 205 (2) 14:20-14:40

An Algorithm of ST Segment Classification and Detection

Zhao Shen[1], Chao Hu[2], Jingsheng Liao[2] and Max Q.-H Meng[3]
1. College of Automation, Northwestern Polytechnical University, Xi'an, Shannxi, China
2. Shenzhen Institutes of Advanced Technology, Shenzhen, Guangdong, China
3. Department of Electronic and Engineering, Chinese University of Hong Kong, Hong Kong , China

- In this paper, ST segment is divided in 15 types to help the analysis the heart disease.
- Based on monitoring ST about 30 minutes and conclude the relationship of ST waveform with ischemia and infarction.
- This method is proved by MIT database and experts.



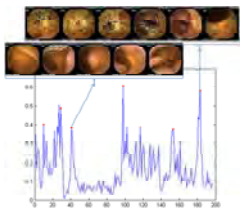
ST Classfication

ELB 205 (3) 14:40-15:00

An Abnormality Based WCE Video Segmentation Strategy

Qian Zhao, Max Q.-H. Meng
Department of Electronic Engineering, The Chinese University of Hong Kong
Shatin, N.T., Hong Kong

- A novel scheme to catalogue the WCE video clips with respect to abnormalities instead of organs proposed.
- The novel method is based on the adaptive nonparametric key-point detection using multi-feature extraction and fusion.
- The experimental results demonstrate that the proposed approach leads to efficient segmentation for WCE video clips without losing critical information of the original video record.



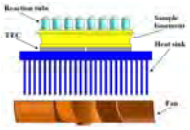
Frame Difference of one video clip

ELB 205 (4) 15:00-15:20

Research on Thermal Cycle System for Real-Time PCR Instrument Based on Equivalent Circuit Model

Yinghao Yao, Zhangwei Chen, Jing Huang , Xiang Wen and Juanrong Liu
State Key Laboratory of Fluid Power Transmission and Control, Zhejiang University
Hangzhou, Zhejiang, China

- An equivalent circuit model of the system using thermoelectric coolers was proposed.
- The modeling results were in good agreement with the experimental results.
- The use of this model allowed the static and dynamic performance of the system to be analyzed by using electrical circuit analysis software such as Multisim10.
- Also, it is an effective and simple way to study how the factors such as thermal resistance of heat sink and thermal grease affect the performance of the system.



Physical model of the thermal cycle system

WP-3:Planning and Scheduling I

Session Chair: Yunhui Liu and Timo R.Nyberg

ELB 206 14:00-15:40 Wednesday, August 18, 2010

ELB 206 (1) 14:00-14:20

Robust and Satisfactory Job Shop Scheduling under Fuzzy Processing Times and Flexible Due Dates

Bing Wang, Qiaoyun Li, Xiaofei Yang and Xiaoming Wang
School of Mechanical & Electrical Engineering, Shandong University at Weihai
Weihai, China

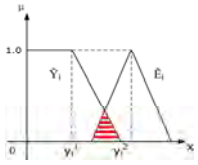
- The earliness/tardiness Job Shop scheduling problems (JSSPs) with fuzzy processing times and the objective of minimizing the makespan is discussed in this paper.
- On the basis of qualitative possibility theory, a measure of schedule robustness is defined to optimize the worst-case performance.
- The robust optimization criterion is established by combining the robustness measure and the satisfaction degree for the most plausible performance.
- A genetic simulated-annealing algorithm is used to solve the fuzzy robust JSSPs.
- An extensive experiment was conducted to testify the effectiveness of the used algorithm and to demonstrate the advantages of the proposed robust optimization model.

ELB 206 (2) 14:20-14:40

Multi-objective flexible job shop scheduling with uncertain processing time and machine available constraint based on hybrid optimization approach

Tian Jing, Murata Tomohiro
Graduate School of Information, Production and Systems, Waseda University
Kitakyushu, Japan

- FJSSP with uncertain factors has been formulated
- Hybrid approach: ACO and TS
- Multi-objective: Makespan, User satisfaction and Machine stability
- Evaluate with other algorithms on three benchmark examples to demonstrate effective and robust



Agreement Index 1

ELB 206 (3) 14:40-15:00

Perishable goods Delivery and Scheduling with time window by Genetic Algorithm

Xu Xunyu and Murata Tomohiro
Graduate school of Information, Production and Systems,
Waseda Unversity, Kitakyushu,Japan

- Design delivery system with several production centers and customers in random position
- Goods is perishable which will lose its value in delivery process
- Customers require time window and they can get penalty cost if receiving goods out of time window
- Use Genetic Algorithm to find optimal scheduling to help decision maker to some commercial decisions

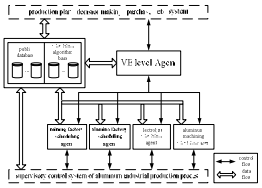

Delivery system in certain area

ELB 206 (4) 15:00-15:20

Research on the Scheduling System in Aluminum Industry Based on Multi-agent

Fantian Zou, Erwei Yin, Fengxing Zou
College of Mechatronic Engineering and Automation, National University of Defense Technology
Changsha, China

- Agent and multi-agent system.
- Scheduling system of aluminum industrial production based on multi-agent.
- Achieve the production of aluminum industry optima scheduling.



Configuration of Scheduling System in Aluminum Industrial Production based on Multi-agent

ELB 206 (5) 15:20-15:40

Design and Improvement of the Material Coding Standardization for Power Group Enterprise

Gang XIONG[1], Lei HU [2], Tao QIN[1], Timo R. NYBERG[3], Fei-yue WANG[1], Qing-song SHI[2]
1. the Key Laboratory of Complex System and Intelligent Science, Institute of Automation, Chinese Academy of Sciences, Beijing, China
2. China Guodian Corporations, Beijing, 100034, China
3. BIT Research Centre, Aalto University, FI-00076 Aalto, Finland

- Materials codes are the base and the key for enterprise information system.
- This paper describes the definition and functions of materials classification and coding firstly, and several prevalent coding approaches are introduced.
- An optimized MC&C system and MC&C IMS can manage and control all materials information more specifically and precisely.


The optimized procedure of controlling the information of materials coding verification

WP-4:Network-based Systems

Session Chair: Yufeng Chen and Ruiquan Lin

ELB 207 14:00-15:40 Wednesday, August 18, 2010

ELB 207 (1) 14:00-14:20

An Adaptive Cross-Layer Multi-Path Routing Protocol for Urban VANET

Yufeng Chen, Zhengtao Xiang, Wei Jian and Weirong Jiang
School of Electrical and Information Engineering, Hubei University of Automotive Technology
Shiyan, China

- Adaptive routing metric is needed, which combines hop- count, link-quality and vehicle-motion information.
- An adaptive cross-layer multi-path routing protocol, R-S-AOMDV, is proposed based on the improvement of AOMDV.
- Compared with AOMDV, R-S-AOMDV achieves better performance, no matter in sparse or dense urban VANET.

Destination IP Address	Sequence Number	Advertised Hop Count	Route List

Routing table entry structure of R-S-AOMDV

Next Hop1	Last Hop1	Hop Count1	Forward-Max-Retran1	Reverse-Max-Retran1	Max-Speed1	Timeout1
Next Hop2	Last Hop2	Hop Count2	Forward-Max-Retran2	Reverse-Max-Retran2	Max-Speed2	Timeout2

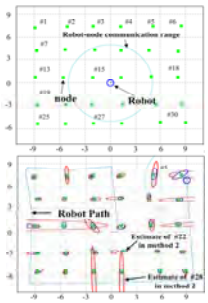
Route list structure of R-S-AOMDV

ELB 207 (2) 14:20-14:40

Cooperative Localization of WSN Aided by Robot

Hai Dan, Zhang Hui, Zheng Zhiqiang
Department of Automatic Control ,National University of Defense Technology,China

- We consider a distributed, probabilistic approach, suitable for outdoor systems with inaccurate range measurements.
- A two stages distributed localizing algorithm and use Gaussian Sum Filter for integrating the data involving robot and wireless sensor network.
- The simulation experiment shows that for inaccurate range measurements the probabilistic approach outperforms existing methods.

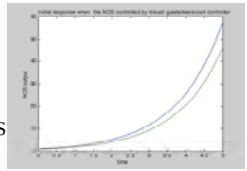


ELB 207 (3) 14:40-15:00

Guaranteed-cost Controller Design for the Networked Control Systems with Network-induced Time Delay

Lin rui quan, Ding xu wei, Huang tao and Wang chun ying
College of Electrical Engineering and Automation, Fuzhou University
Fuzhou, Fujian ,China

- A design method of non-fragile guaranteed-cost controller for the networked control systems (NCS) with network-induced time delay is discussed.
- The example showed that the designed controller ensures the NCS asymptotically stable and the upper bound of the cost function value in expectation can also be obtained when the controller gain is of variation.



Initial response with robust controller

ELB 207 (4) 15:00-15:20

Primary Models of Passenger Car Information Integrated Control System

Ying YOU, Jian HU and Gangyan LI
School of Mechanical & Electronic Engineering, Wuhan University of Technology
Wuhan, Hubei, China

- Conceptual Model of Passenger Car Information Integrated Control System.
- Structural Model of Passenger Car Information Integrated Control System .
- Control Model of Passenger Car Information Integrated Control System .
- Design of WG6100ENH Model Natural Gas City Bus Information Integrated Control System.

Experimental installation of WG6100ENH model natural gas city bus information integrated control system

ELB 207 (5) 15:20-15:40

Coevolving Near-Optimal Strategies for Negotiation with Incomplete Information using a Diversity Controlling GA

Jeonghwan Gwak and Kwang Mong Sim
Multiagent and Cloud Computing Systems Laboratory, Gwangju Institute of Science and Technology
Gwangju 500-712, South Korea

- This work investigates the problem of coevolving near-optimal negotiation strategies for the bilateral negotiation with incomplete information using a genetic algorithm (GA).
- To solve the drawback of premature convergence of a conventional GA, we proposes a GA which has a novel dynamic diversity controlling capability (D^2C-GA).
- Empirical results showed that the proposed GA generally outperforms the traditional GA for finding near-optimal strategies.

D^2C-GA Algorithm flow chart

WE-1:Control and Automation III

Session Chair: Simon Yang and Xingyu Jiang

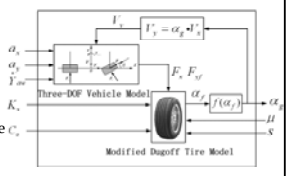
ELB 202 16:00-17:40 Wednesday, August 18, 2010

ELB 202 (1) 16:00-16:20

Estimation of Vehicle Side Slip Angle in Nonlinear Condition Based on the State Feedback Observer

Weida Wang[1], Lijuan Yuan[2], Sheng Tao[3], Wei Zhang[3] and Tianshu Su[3]
1. School of Mechanical Engineering, Beijing Institute of Technology
2. Department of Mechanical Engineering, North China University of Water Conservancy and Electric Power
3. China Academy of Transportation Sciences, Ministry of Communications of P. R. China

- This algorithm is based on a nonlinear observer that contains a modified Dugoff tire model.
- At first, the longitudinal and lateral forces of the front tires are estimated by a closed loop state feedback observer. Then the value of the parameter f (λ) in Dugoff model is calculated. At last, the vehicle side slip angle is calculated by the relation between the tire and vehicle side slip angles.
- Accurately estimate the vehicle side slip angle under linear condition and nonlinear condition to some extent.

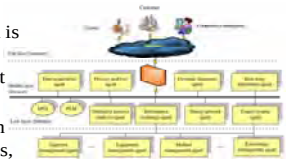


ELB 202 (2) 16:20-16:40

An Intelligent Decision Support System for Process Quality Control

Xingyu Jiang
School of Mechanical Engineering, Shenyang University of Technology
Shenyang, China

- An intelligent decision support system for process quality control is presented, the corresponding decision support modules are built based on multi-agent.
- The intelligent support system can realize dynamic, real-time analysis, diagnosis and adjustment of process quality control in multi-type and small batch production enterprise
- A theoretical basis and technological insurance



Structure of intelligent decision support system for process quality control

ELB 202 (3) 16:40-17:00

Robust Fault-tolerant H_2 / H_∞ Controller Design Based On State Feedback

Luo Yuesheng[1,2], Gong Xinping[1,2], Luo Yuesheng[1,2] and Gong Xinping[1,2]
1. National Defence Key Laboratory of Autonomous Underwater Vehicle Technology
2. School of Automation, Harbin Engineering University

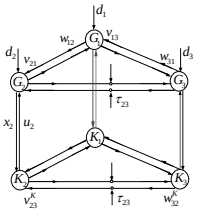
- This paper studies mixed H_2 / H_∞ robust fault-tolerant control for a class of uncertain systems with actuator or sensor faults.
- A sufficient and necessary condition is derived by using Linear Matrix Inequality (LMI) approach, which guarantees that the uncertain closed-loop system is robustly asymptotically stable and satisfies the mixed H_2 / H_∞ constraints in both normal and any actuator or sensor failure cases.
- Under the designed state feedback controller, in any case, the closed-loop system remains asymptotically stable and satisfies the given disturbance attenuation performances.
- It gives a uniform conclusion on those actuators' faults or sensors' faults

ELB 202 (4) 17:00-17:20

Distributed Model Reference Adaptive Sliding Mode Control for Spatially Interconnected Systems With Perturbed Links

Di Yu
Institute of Electronic Information Engineering, University of Northeast Petroleum
DaQing, China

- A distributed adaptive sliding mode control scheme is developed for solving the robust tracking problem for a class of spatially interconnected systems with perturbed links based on Lyapunov stability theorem.
- The adaptation laws are proposed to update the unknown upper bound of nonlinear perturbations.
- Distributed integral sliding mode controllers are constructed based on the information from the adaptive scheme, combined with the approaching law method.
- The proposed control strategy is effective.



Interconnected Closed loop System with Three Subsystems

ELB 202 (5) 17:20-17:40

Delay-dependent Robust H-infinity Control of Uncertain Switched Systems

Yan LI, Yuzhong Liu
School of Mathematics and Systems Science, Shenyang Normal University, Shenyang, Liaoning Province, China

- The problem of delay-dependent robust H-infinity control of time-delay switched systems with disturbance and time-varying structured uncertainties is considered in this paper.
- We use Lyapunov function and S-procedure methods to deal with the above problem.
- Some free weighting matrices are introduced to make the results be less conservative.
- Finally, a simulation example is employed to illustrate the validity of the obtained results.

WE-2:Instrumentation Systems

Session Chair: Yunhui Liu and Baoshan Shi

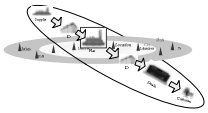
ELB 205 16:00-17:40 Wednesday, August 18, 2010

ELB 205 (1) 16:00-16:20

KPI Evaluation System of Location Decision for Plant Relocation from the View of the Entire Supply Chain Optimization

Dianjun Fang, Weibing Weng
Fraunhofer Institute for Material Flow and Logistics
Dortmund, Germany

This paper presents a new KPI evaluation system for plant relocation from the viewpoint of the entire supply chain optimization by considering the location quality, cost and flexibility of an entire supply chain. By applying the new KPI evaluation system for a plant relocation decision shows that this KPI evaluation system can help deciding the right location for plant relocation.



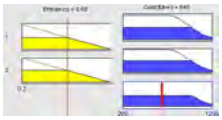
Position of a plant

ELB 205 (2) 16:20-16:40

Multi-objective Fuzzy Particle Swarm Optimization in

Ren Yuan, Zhong Zhidan, Zhang Bo, Lv Feng, Xu Huili
College of Electromechenical Engineering, Henan University of Science and Technology
Luoyang, Henan Province, China

- Multi-objective fuzzy particle swarm optimization (MOFPSO) for the Proton Exchange Membrane Fuel Cells (PEMFC) generation system.
- The efficient and economic aspects are considered simultaneously.
- MOFPSO algorithm is used to find a set of Pareto optimal solutions with respect to the aforementioned objective functions.
- The performance of the proposed optimizer is demonstrated under various operating conditions.



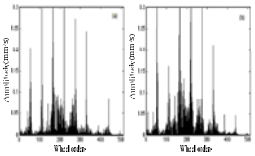
The cost and efficiency membership functions

ELB 205 (3) 16:40-17:00

Vibration Signal Analysis System Based on Hybrid Programming of Delphi and Matlab

Baoshan Shi[1], Kuanfang He[2] and Xibin Wang[3]
1. Beijing Institute of Technology[3], Zhuhai Campus, China
2. Hunan Provincial Key Laboratory of Health Maintenance for Mechanical Equipment, China
3. Department of Mechanical and Vehicle Engineering, Beijing Institute of Technology, Beijing, China

- Vibrational signal analysis is performed.
- Hybrid programming of Matlab and Delphi using data file for agency is achieved for data communication.
- This technique sheds light on handling scientific numerical problems in engineering system software.



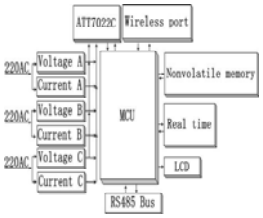
Amplitude spectrum of average of the velocity signals

ELB 205 (4) 17:00-17:20

An Intelligent Three-Phase Voltage Unbalance Measuring Instrument Based on the ATT7022C

Guilin Zheng and Yan Xu
Department of Automation, Wuhan University, China

- This instrument is designed on the ATT7022C.
- The two degree Newton interpolation algorithm is applied.
- The three-Phase voltage unbalance is calculated based on the definition of the voltage unbalance factor.
- The results of the experiments show that this instrument is effective, feasible and precise.



The structure of the instrument

WE-3:Planning and Scheduling II

Session Chair: Li Li and Fengyu Zhou

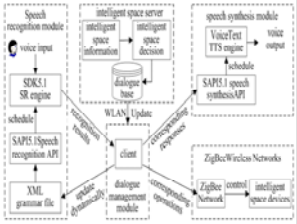
ELB 206 16:00-17:40 Wednesday, August 18, 2010

ELB 206 (1) 16:00-16:20

Research and Implementation of Voice Interaction System Based on PC in Intelligent

Fengyu Zhou, Guohui Tian, Yang Yang, Hairong Xiao and Jingshuai Chen
Research Laboratory for Service Robotics, Shandong University Jinan, China

- The design scheme of voice interaction system in service robots intelligent space is presented.
- Design of speech recognition module, and program implementation.
- Design of speech synthesismodule, and program implementation.
- The design thought of dialogue management module and the design of dialogue base are introduced.
- Experiment and application.



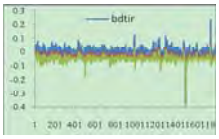
Structure of system

ELB 206 (2) 16:20-16:40

The Risk Measures Based on GARCH Model in Tanker Shipping Market

Jinlin Ma
Department of Transportation, School of Automobile and Traffic Engineering, Jiangsu University
Zhenjiang, Jiangsu, China

- Investigate the risk measures based on general auto-regress conditional heterostedasticity (GARCH) model in tanker shipping industry, to choose Baltic Dirty Tanker Index as study object.
- ApplyValue-at-Risk model for measuring risks in shipping market.
- The parameters of the model are estimated by statistical software package Eviews.
- According to analyze the economic insignificant of parameters in the model, and get the conclusions that the freight return possesses persistence, and the VaR model is valid on 99% confidence level.



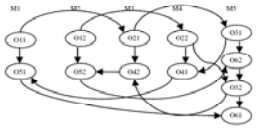
VaR under Different Confidence Level

ELB 206 (3) 16:40-17:00

Integrated Intelligent Optimized Dynamic Scheduling of Semiconductor Fabrication Facilities

Li Li, Fei Qiao
School of Electronics and Information Engineering, Tongji University
Shanghai, China

- A novel intelligent optimized dynamic scheduling method, integrating intelligent sequencing with dynamic dispatching, is proposed.
- ODC includes a Partheno-Genetic Algorithm (PGA) to obtain optimized sequencing plan, a dispatching rule (DR) t achieve dynamic dispatching solution and coordination algorithm (CA) to integrate PGA with DR.
- It is shown that ODC is superior to PGA, DR and FIFO with better performance of mean cycle time (MCT), makespan and on-time delivery (OTD) under uncertain environments.



Restraint of Minifab model

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IEEE ICAL 2010 Program at a Glance

Sunday, August 15, 2010, Ground Floor, Esther Lee Building, The Chinese University of Hong Kong				
14:00-18:00	**Conference Registration** **in the Lobby of the Esther Lee Building, The Chinese University of Hong Kong, Shatin, Hong Kong**			
Monday, August 16, 2010, Esther Lee Building, The Chinese University of Hong Kong				
09:00-10:00	**Plenary Lecture I: Lecture Theater 1 (LT1), Chair: William R. Hamel** **Global Trends in Logistics and Supply Chain Management: The Role of Technology Now and in the Future** **Prof. Chad Autry, University of Tennessee, USA**			
10:00-10:20	Morning Tea and Coffee Break			
10:20-12:00	**MA-1**: ELB 202 **Computer Vision I** Papers 130, 225, 40, 259, 260	**MA-2**: ELB 205 **Robotics I** Papers 36, 72, 82, 121, 213	**MA-3**: ELB 206 **Supply Chain Management** Papers 2, 30, 195, 98, 165	**MA-4**: ELB 207 **Modeling and Simulation I** Papers 8, 101, 128, 186, 162
12:00-14:00	Lunch break with lunch served at the Chung Chi College Staff Club (Admission with lunch ticket)			
14:00-15:40	**MP-1**: ELB 202 **Computer Vision II** Papers 254, 201, 132, 57, 218	**MP-2**: ELB 205 **Robotics II** Papers 103, 107, 150, 163, 204	**MP-3**: ELB 206 **Logistics Technology** Papers 22, 118, 100, 50	**MP-4**: ELB 207 **Modeling and Simulation II** Papers 90, 147, 203, 55, 52
15:40-16:00	Afternoon Tea and Break			
16:00-16:45	**Bus pickup at the entrance of Esther Lee Building and travel to TST Star Ferry (Admission with Jumbo reception ticket)**			
16:45-18:10	**Magnificent Victoria Harbor Boat Cruise and travel to Jumbo Kingdom Seafood Restaurant (Admission with Jumbo reception ticket)**			
18:10-19:50	**IEEE ICAL 2010 Reception at the world famous Jumbo Kingdom Seafood Restaurant (Admission with Jumbo reception ticket)**			
19:50-21:30	**Travel by bus to the very famous tourist spot in HK: The Peak and view the marvelous Victoria Harbor night view from the Peak**			
21:30-22:30	**Travel back to the Chinese University of Hong Kong by bus**			
Tuesday, August 17, 2010, Esther Lee Building, The Chinese University of Hong Kong				
09:00-10:00	**Plenary Lecture II: Lecture Theater 1 (LT1), Chair: Max Q.-H. Meng** **NOTES Surgery in China** **Prof. Jun Niu, Shandong University, China**			
10:00-10:20	Morning Tea and Coffee Break			
10:20-12:00	**TA-1**: ELB 202 **Automatic Control I** Papers, 69, 74, 79, 149, 126	**TA-2**: ELB 205 **Robotics III** Papers 139, 249, 237, 114, 152	**TA-3**: ELB 206 **Process Automation** Papers 88, 95, 41, 219, 223	**TA-4**: ELB 207 **Modeling and Simulation III** Papers 86, 92, 84, 226
12:00-14:00	Lunch break with lunch served at the Chung Chi College Staff Club (Admission with lunch ticket)			
14:00-15:40	**TP-1**: ELB 202 **Automatic Control II** Papers 138, 182, 127, 136, 253	**TP-2**: ELB 205 **Robotics IV** Papers 111, 176, 140, 207, 248	**TP-3**: ELB 206 **Automation and Logistics** Papers 75, 129, 133, 142, 153	**TP-4**: ELB 207 **Modeling and Simulation IV** Papers 94, 177, 70, 76
15:40-16:00	Afternoon Tea and Break			
16:00-16:30	**No activities arranged**			
16:30-21:30	**VIP and PC Dinner at Lei Yu Mun by invitation (Bus leaves from Esther Lee Building at 16:30, admission with invitation ticket)**			
Wednesday, August 18, 2010, Esther Lee Building, The Chinese University of Hong Kong				
09:00-10:00	**Plenary Lecture III: Lecture Theater 1 (LT1), Chair: Yangmin Li** **Parallel Control and Management for Networked Complex Systems: Production, Logistics, and Transportations** **Prof. Feiyue Wang, Institute of Automation, Chinese Academy of Sciences, China**			
10:00-10:20	Morning Tea and Coffee Break			
10:20-12:00	**WA-1**: ELB 202 **Control and Automation I** Papers 134, 251, 250, 104, 145	**WA-2**: ELB 205 **Robotics V** Papers, 65, 239, 108, 164, 262	**WA-3**: ELB 206 **Evaluation and Optimization** Papers 180, 44, 141, 168, 194	**WA-4**: ELB 207 **Modeling and Simulation V** Papers 189, 166, 115, 116
12:00-14:00	Lunch break with lunch served at the Chung Chi College Staff Club (Admission with lunch ticket)			
14:00-15:40	**WP-1**: ELB 202 **Control and Automation II** Papers 60, 220, 252, 217, 216	**WP-2**: ELB 205 **Biomedical Instrumentation** Papers 234, 236, 159, 99	**WP-3**: ELB 206 **Planning and Scheduling I** Papers 190, 119, 120, 160, 174	**WP-4**: ELB 207 **Network-based Systems** Papers 199, 181, 7, 242, 196
15:40-16:00	Afternoon Tea and Break			
16:00-17:40	**WE-1**: ELB 202 **Control and Automation III** Papers 39, 198, 59, 179, 155	**WE-2**: ELB 205 **Instrumentation Systems** Papers 42, 77, 244, 172	**WE-3**: ELB 206 **Planning and Scheduling II** Papers 122, 29, 124	
17:40-18:00	**Walk from Esther Lee Building to Hyatt Regency Hong Kong Sha Tin Hotel**			
18:00-20:30	**Award Banquet at Hyatt Regency Hong Kong Sha Tin Hotel (Admission with Award Banquet Ticket)**			
Thursday, August 19, 2010				
09:00-18:00	Travel from Hong Kong to Macau and Registration and Reception at the University of Macau			
Friday, August 20, 2010				
09:00-21:00	Workshops at the University of Macau			