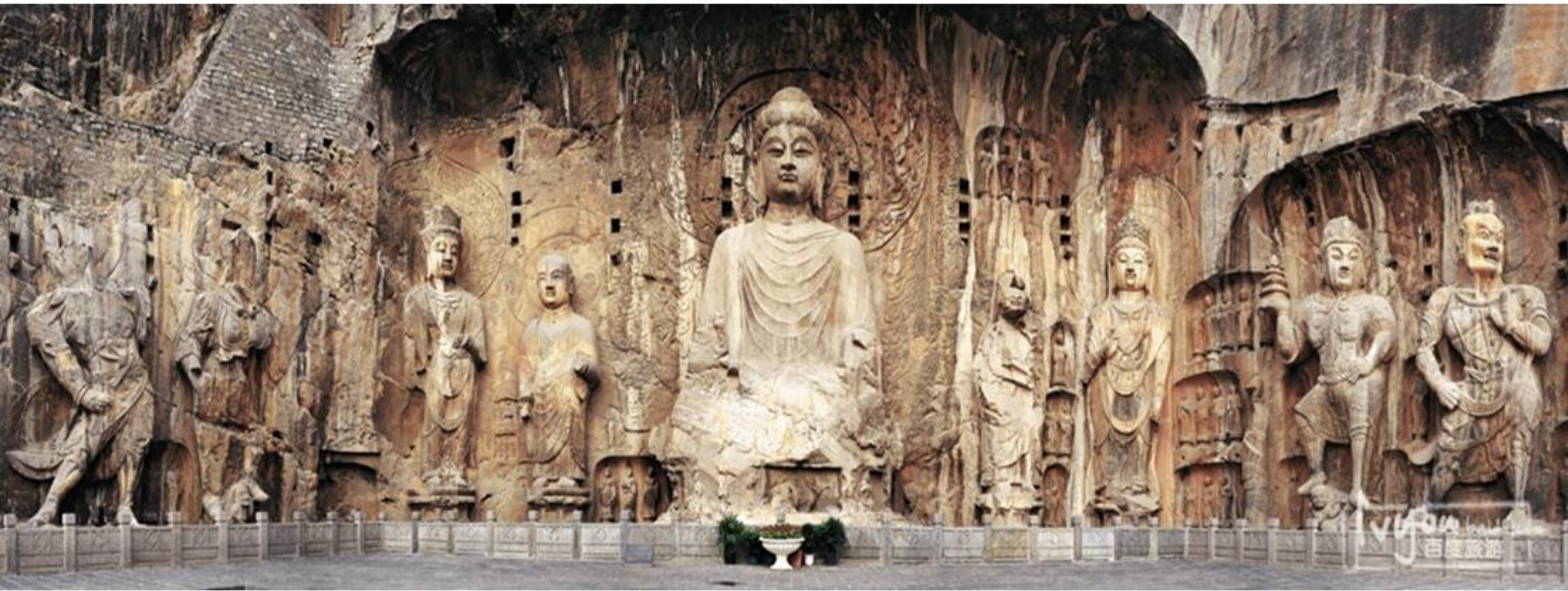# ICAMechS 2013

2013 International Conference on Advanced Mechatronic Systems

Conference Program

September 25-27, 2013, Luoyang, China

2013 ICAMechS

International Conference on Advanced Mechatronic Systems

September 25-27, 2013

Luoyang, China

PROGRAM

Organizers:

Henan University of Science and Technology, Luoyang, China
International Journal of Advanced Mechatronic Systems
Tokyo University of Agriculture and Technology, Tokyo, Japan
IEEE Systems, Man, and Cybernetics Society

Sponsors:

The National Natural Science Foundation of China
The Institute of Complex Medical Engineering
Zhongyuan University of Technology, China
Institute of Automation, Shandong Academy of Sciences, China
International Journal of Modelling, Identification and Control
International Journal of Innovative Computing, Information and Control

Cooperation with:

The Society of Instrument and Control Engineers
The Institute of Systems, Control and Information Engineers
Group C of The Institute of Electrical Engineers of Japan

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2013 International Conference on Advanced Mechatronic Systems

September 25-27, 2013

Luoyang, China

GREETINGS FROM THE GENERAL CHAIRS

On behalf of ICAMechS 2013 Organizing Committee, it is our great pleasure and honor to welcome you to the 2013 International Conference on Advanced Mechatronic Systems. The conference is held on September 25-27, 2013 in Luoyang, China, organized by Henan University of Science and Technology, International Journal of Advanced Mechatronic Systems, Tokyo University of Agriculture and Technology and IEEE Systems, Man, and Cybernetics Society, sponsored by The National Natural Science Foundation of China, The Institute of Complex Medical Engineering, Zhongyuan University of Technology, Institute of Automation, Shandong Academy of Sciences, International Journal of Modelling, Identification and Control and International Journal of Innovative Computing, Information and Control, and cooperation with The Society of Instrument and Control Engineers, The Institute of Systems, Control and Information Engineers and Group C of The Institute of Electrical Engineers of Japan.

ICAMechS 2013 is an all-volunteer conference, and this conference provides an international forum for professionals, academics, and researchers to present latest developments from interdisciplinary theoretical studies, computational algorithm development and applications of advanced mechatronic systems. Reflecting these methodological and technological trends, this conference includes presentations of excellent and interesting papers in all theoretical studies and applications of advanced mechatronic systems. Novel quantitative engineering and science studies are considered as well.

Luoyang is a beautiful historic city with 5000 years civilization history, Located in the West of Henan Province, China. Luoyang got its name due to its location in the adret of the ancient Luoshui River. It was the capital city for 13 dynasties, so it is named as the "Ancient Capital of the Thirteen Dynasties", ranking top one among the seven ancient capitals in China. The Heluo area with Luoyang as the center is the important origin of the Huaxia Civilization.

Luoyang is also a place for entertainment and recreation. It is featured with beautiful landscape scenery, and places of interested are scattered all over the city. There are 4 national 5-A level scenic zones, 11 national 4-A level scenic zones and 11 national 3-A level scenic zones.

We would like to present our sincere thanks to the four invited speakers, Prof. Hong Wang, Prof. Toru Yamamoto, Prof. Hiroshi Takamori and Prof. Tao Tang, for the special lectures, authors of presented papers, participants, the members of Program Committee and Organizing Committee.

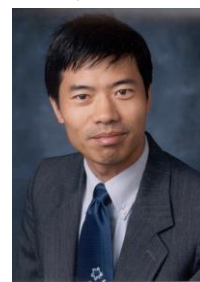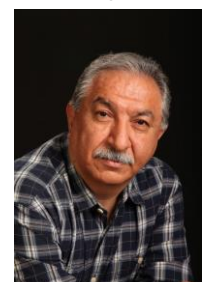Best regards,
General Chairs

Mingcong Deng   Zongxiao Yang   Hongnian Yu   Mengchu Zhou   Ken Nagasaka

CONFERENCE HIGHLIGHTS

A total of 183 papers were submitted to the 2013 ICAMechS from different parts of the world. Each paper was reviewed by two or three reviewers. The final program includes 144 papers among which 96 are the oral papers and 48 are poster papers. There are four plenary speeches, one plenary panel discussion. Each oral session consists of 4-6 papers. Papers were assigned with the sole purposed of forming coherent sessions.

CONFERENCE REGISTRATION

The conference registration desk, located at the lobby of Lee Royal Hotel.Medu, will be opened during the following time:

14:30-17:30, September 25, 2013 (Wednesday)
08:30-17:30, September 26, 2013 (Thursday)
08:30-17:30, September 27, 2013 (Friday)

The full registration includes Welcome Reception, Conference Banquet, Closing Reception and Conference CD-ROM Proceedings.

Additional sets of CD-ROM proceedings may be purchased at the registration desk ($50 USD for CD-ROM proceedings).

SOCIAL EVENTS

Welcome Reception (Lee Royal Hotel.Mudu, 18:30 - 20:30, September 25, 2013)
Conference Banquet (Lee Royal Hotel.Mudu, 18:30 - 21:00, September 26, 2013)
Closing Reception (Lee Royal Hotel.Mudu, 18:30 - 20:30, September 27, 2013)

HOTEL RESERVATIONS

1. Lee Royal Hotel.Mudu

Add: No.239, Kaiyuan Street, Luolong District

Luoyang, China

Tel:+86-379-65979999

URL: http://www.mudu-leeroyalhotel.com/index.php?Locale=en-us

2. Luoyang Dawei Jiuchao Hotel

Add: No.20, Zhanlan Street, Luolong District

Luoyang, China

Tel: +86-379-65557555

URL: http://www.lydwjc.com

Luoyang Dawei Jiuchao Hotel is invested and directly managed by Luoyang Dawei Decoration Engineering Co. It is a set of wine, tea, cooking, painting as one of the super luxury shopping experience hotel. It is located in the political, commercial center of Luolong new district, the beautiful city of peony—Luoyang. The Hotel faces musical fountain on the east, major shopping district on the south, Wangcheng Avenue on the west and Luoyang City Government on the north, with convenient traffic and unique geography location.

High standard facilities, specialization, internationalization, standardization management concept and model reflect its concept of pursuit of excellence. Regardless of business, leisure or entertainment, Luoyang Dawei Jiuchao Hotel is your ideal choice.

CONFERENCE LOCATION

The conference site map is given below.
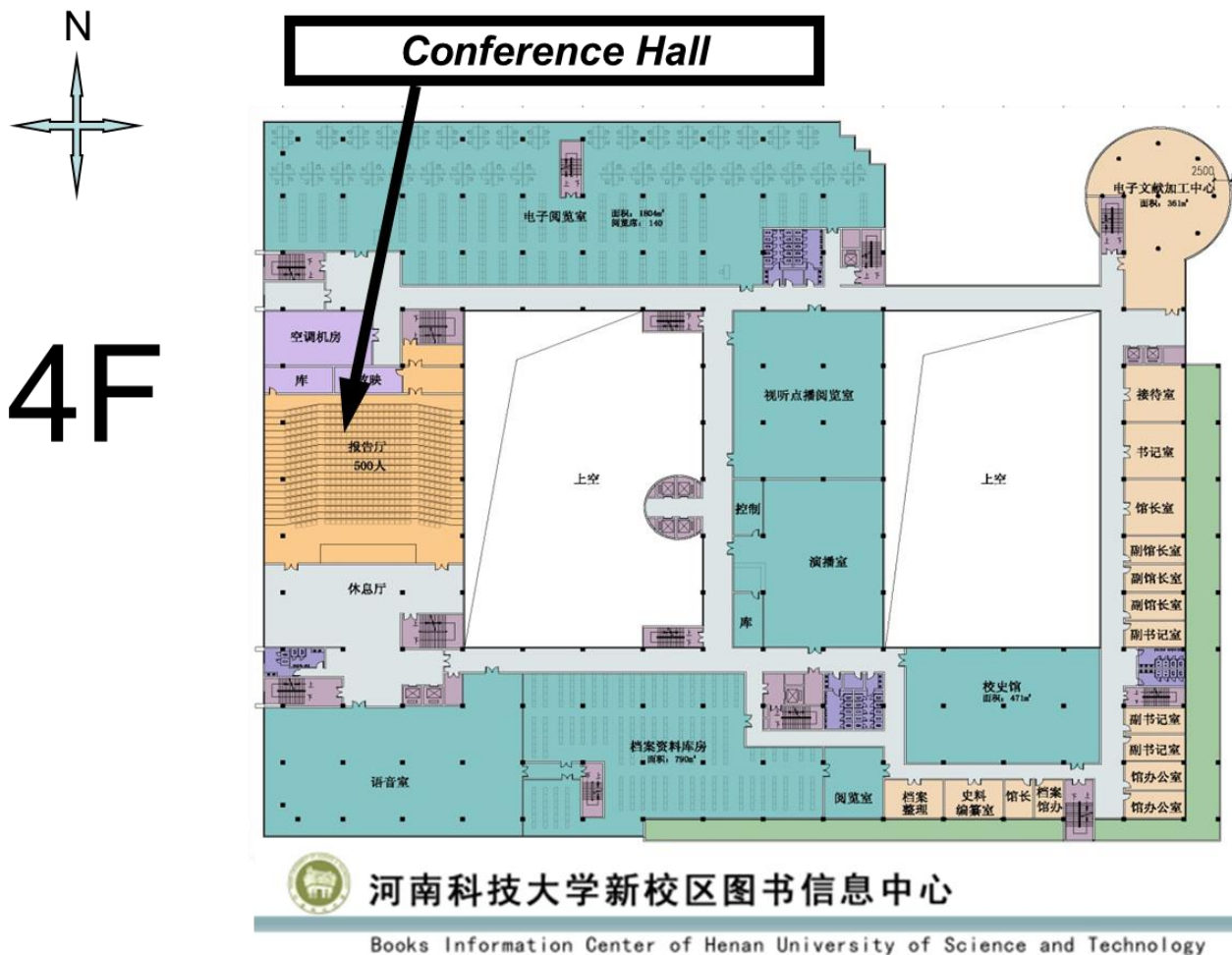
(For Plenary lectures, poster session and plenary panel discussion)

2F

N
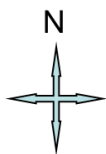
No.1 Meeting room
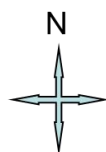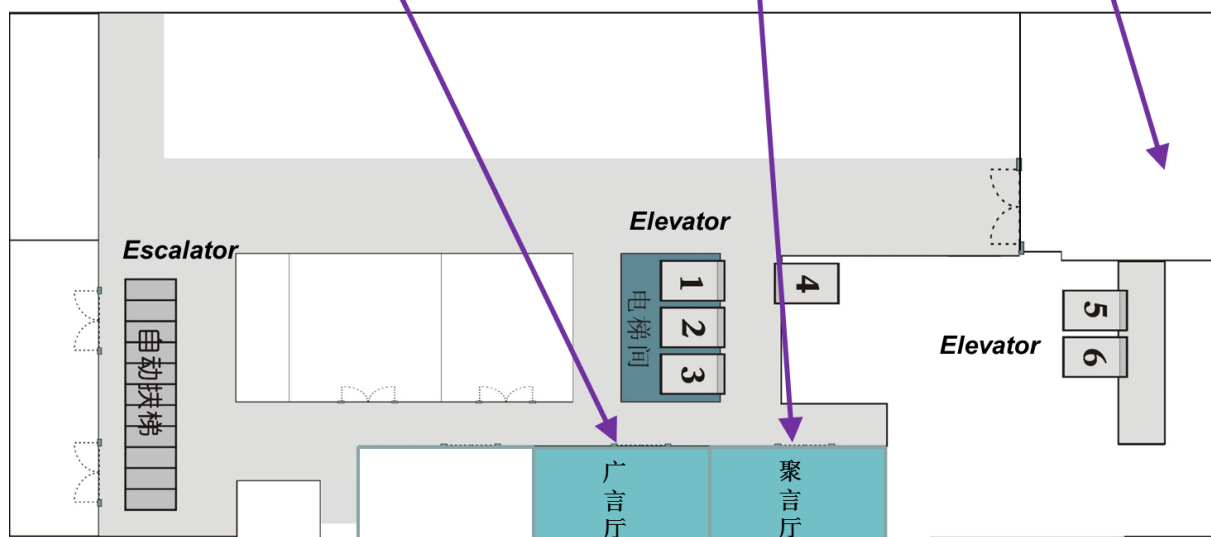Mingjian Hall

No.2 Meeting room
Guangyan Hall

Restaurant

Elevator
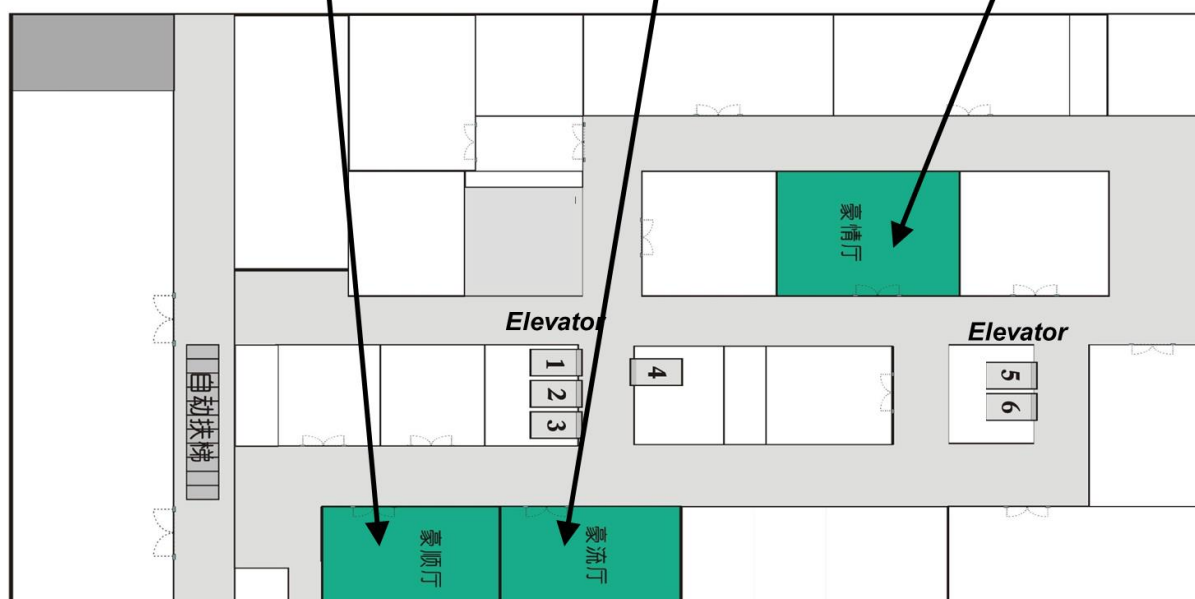
Escalator

电动扶梯

1
2
3

电梯间

4

Elevator

5
6

广言厅

聚言厅

3F

N

No.4 Meeting room
Haoshun Hall

No.5 Meeting room
Haoliu Hall

No.3 Meeting room
Haoqing Hall

豪清厅

Elevator

自动扶梯

1
2
3

4

Elevator

5
6

豪顺厅

豪流厅

(For lecture session)

TRANSPORTATION

Conference Location Address

1. *Main Conference Hall*

   Books Information Center of HUST

   No.263, Kaiyuan Street, Luolong District

   Luoyang, China

2. *Parallel Sessions Venue*

   Lee Royal Hotel.Mudu

   No.239, Kaiyuan Street, Luonan District

   Luoyang, China

Map from the stations

1. From Zhengzhou to Luoyang

   Take airport bus from **Zhengzhou Xinzheng International Airport** to **Zhengzhou Rail Station** for 15 Yuan, about 40 minutes.

   By high speed trains from **Zhengzhou Rail Station** to **Luoyang longmen High-speed Rail Station**, 89.5 Yuan for first-class tickets and 59.5 Yuan for 2nd-class tickets, about 50 minutes.

2. Take taxi to Books Information Center of HUST:

   From **Luoyang Airport**, for less than 40 Yuan ,about 35 minutes usually.

   From **Luoyang Rail Station (Coach Station)**, about 25 minutes, less than 20 Yuan.

   From **Luoyang longmen High-speed Rail Station**, less than 15 Yuan, about 18 minutes.

3. Take taxi to Lee Royal Hotel.Mudu:

   From **Luoyang Airport**, for less than 35 Yuan, about 30 minutes usually.

   From **Luoyang Rail Station (Coach Station)**, less than 15 Yuan, about 20 minutes.

   From **Luoyang longmen High-speed Rail Station**, less than 13 Yuan, about 15 minutes.
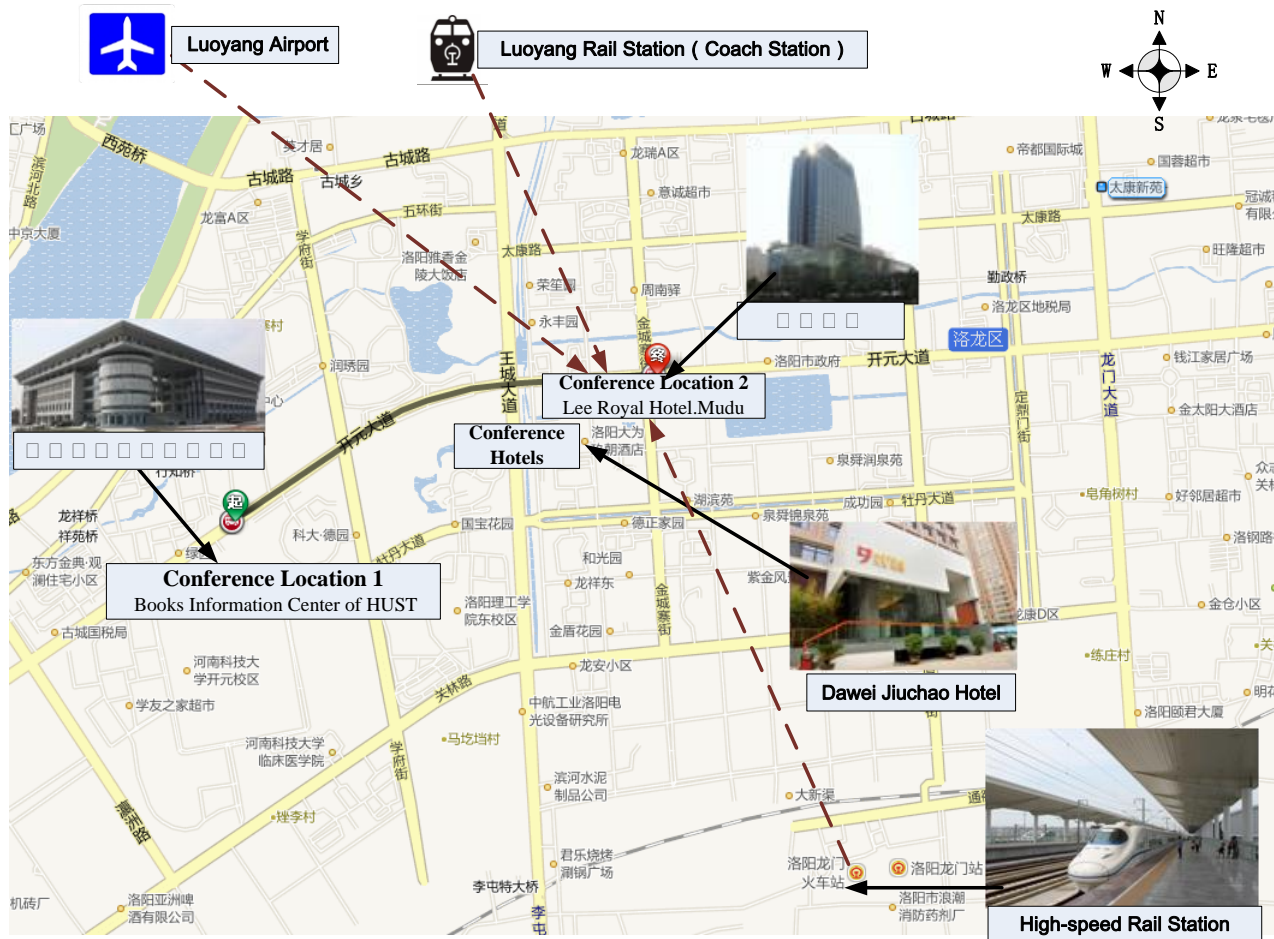
(Traffic Map)

We have a shuttle bus service between the two conference locations during the conference.

PLENARY SPEAKERS

Prof. Hong Wang, Manchester University, UK

Professor Hong Wang received the PhD degrees from Huazhong University of Science and Technology in P R China, 1987. He then worked as a postdoc at Salford, Brunel and Southampton Universities between 1988 and 1992. He joined UMIST in 1992 as a lecturer, and was then promoted to a Senior Lecturer in August 1997, to a Reader in August 1999, and to a Professor in April, 2002.

Prof. Wang is a member of 3 International Federation of Automatic Control Technical Cttee and associate editor for IEEE Transactions on Control Systems Technology. He was associate editor of leading control journal IEEE Transactions on Automatic Control, editorial board member for 7 international journals and has served as IPC member and conference chairman for many international conferences. He is the member of executive cttee for UK Automatic Control Council and served twice as EPSRC college member. Professor Wang originated the work on stochastic distribution control, where the main purpose of control input design is to make the shape of the output probability density functions to follow a targeted function. He is the leading author of three books and has also published over 200 papers in international journals and conferences. He has also received the best paper award from Int. Conf. Control 2006 and Jasbar Momorial Prize for his outstanding contribution in the Science and Technology Development for paper industries in 2006.

Title:

Experimental vs Analytical Control Research for Complex Control System Design --- a Scientific Experimental Perspective

Abstract:

Operational control for complex industrial processes is facing challenges in terms of modelling, control and optimization under multiple structured networks and big data feature, and in terms of complexities that make the modelling unapproachable. Typical examples of such complex industrial processes are steel making, paper making, car manufacturing and mineral processing etc. This has broken the existing research mode in control where one can largely use accurate models of the plant to obtain control strategies. Indeed, these challenges can only be met via conducting large scale and extensive experiments and the research mode should be changed to experiment focused way. This requires the establishment for the first time a large scale experimental system that can totally mimic operation of the concerned complex industrial processes. This presentation looks into the recent development of the construction of a large scale experimental systems for control systems research, where the system consists of big data communication network unit, big data centre, representation of the dynamics of complex industrial processes, feature extraction for dynamics and closed loop characteristics, control research interface and distributed control systems. It is expected that such an experimental system would promote and initiate next generation of modelling, control and optimization for complex industrial processes.

Prof. Toru Yamamoto, Hiroshima University, Japan

Toru Yamamoto received his B.Eng. and M.Eng. degrees from the University of Tokushima in 1984 and 1987, respectively, and his D.Eng. degree from Osaka University in 1994. He is currently a Professor in the Division of Electrical, Systems and Mathematical Engineering at Hiroshima University. He was a Visiting Researcher in the Department of Mathematical Engineering and Information Physics at the University of Tokyo in 1991, and during the autumn of 1996, he was a Visiting Professor in the Department of Chemical and Materials Engineering at the University of Alberta, Edmonton, Canada. In addition, he was an overseas research fellow of JSPS(Japan Society for Promotion of Science) at the University of Alberta for 6 months from March in 2006. His current research interests are in the area of data-oriented controller design and process control. He won the Best Poster Paper Award at the 3rd Asian Control Conference in 2000, and received a Prize of Progress from the Institute of Electrical Engineers in Japan(IEEJ) in 2003 and Technology Awards from the Society of Instrumentation and Control Engineers in Japan(SICE) in 2003 and 2009. He is also the NOC Chair of the coming ADCONIP(5th International Symposium on Advanced Control of Process Industries) to be held in Hiroshima on May 27-30, 2014.

Title:

Data-Oriented Control Systems Design -Data, Data and Data-

Abstract:

The industrial world, in response to the intensifying global competition, has attempted to further reduce production costs such as energy-saving and labor-saving measures, as well as improve the quality of its products. Moreover, it has been recognized that in order to solve these problems, high-performance control systems are required. In order to solve the problems stated above, high-performance control systems are required. One the other hand, with the progress of computer technology in the recent years, a large amount of data is able to be processed in a short period of time. In particular, efforts for storing operational data processing, and the construction of programs is carried out relatively easily, improvement to the control performance has become increasingly more active. The trend has been to gradually change the framework of the control system design method, recently, data-oriented control system design methods that are utilized directly on the control system design and operations data has gained much attention. In light of the current situation described above, in this talk, the following topics focusing on control system design methods based on data, are introduced.

I. Design of performance-driven control systems

II. Design method of a controller using a database

Prof. Hiroshi Takamori, Waseda University, Japan

Hiroshi Takamori is Visiting Researcher at Graduate School of Energy and Environment Engineering and at Finance Research Center, Waseda University, Tokyo. He is Professor Emeritus at Aoyama Gakuin University, Tokyo. His present research includes renewable energy management for the smart grid and developing business models in a smart community. He received his B.E. and M.E. degrees in electrical engineering from Waseda Univ., Tokyo, in 1960 and 1962, respectively. He went on to study at Columbia Univ., N.Y., in the Fulbright Scholar Program in 1964, and received PhD in Operations Research in 1968. After teaching at Wharton School, University of Pennsylvania, for two years, he returned to Japan, and taught and did research in Systems Science as Professor at the School of International Politics, Economics and Business, Aoyama Gakuin Univ., Tokyo, from 1970 to 2005. He took the title of Fellow of the Operations Research Society of Japan, in 1992. He published a book: "Foundation of Modern Finance Theory," Toyo-Keizai-Shimpo-sha, 2002. He also wrote numerous papers on Operations Research, Economics and Systems Science.

From 2005 to 2008, he was Professor of Finance and Real Options at Graduate School of Finance and Accountancy, Waseda Univ. He co-founded the Japan Association of Real Options and Strategy in 2007, and presently serves as the General Council of the Association. He coauthored, with Dr. Nagasaka and Dr. Go, "A Mechanism Design for Managing Emissions in Energy Supply Sector" in the Journal of Advanced Computational Intelligence and Intelligent Informatics, Vol.17 No.1, in Jan. 2013. His most recent paper addresses "Supply-side management of CO_2 emissions under asymmetry of information."

 Title:

CO_2 Emissions Control in the Power Industry - Control Applied to a Societal System -

 Abstract:

The energy transforming sector including electric power generators accounts for 37% of the total CO_2 emissions in case of Japan. The management of CO_2 emissions in an industry is a control problem. This talk first tries to illuminate how the emissions control is different from controlling mechanical or physical systems. The object here is a collection of firms, each of which behaves purposefully and competitively seeking its own objective. Emissions are simply outside their business concern, and are what are called the externalities in Economics. As to allocating the externalities, the firms are in conflict of interest. Managing the emissions of production activities is essentially a game among the regulatory authority and those who are to be regulated. The environmental regulator's role is to design a fair set of rules of competition among the firms. A salient difficulty here is that the regulatory authorities generally find that part of the information they need is in the private hands of those who are regulated and is rarely available to the regulator. The presenter demonstrates Montero's auction mechanism as a way to overcome the information asymmetry, though impractical for electric power industry. The presenter proposes a practical program for managing emissions without relying upon practicing the auction. The model provides a system-wide price for charging emissions and also a reference level of emissions for each firm, the discrepancy from which is charged or rewarded. Within the framework of the price mechanism, the program affirms the profit seeking competition among individual firms in the free market economy.

Prof. Tao Tang, State Key Laboratory of Rail Traffic Control and Safety, Beijing Jiaotong University, China

Professor Tao Tang received the PhD degrees from Chinese Academic of Science in P R China, 1991. He joined Beijing Jiaotong University in 1991 as a lecturer, and was then promoted to an Associate Professor Senior in December 1994, to a Professor in September 1999.

Professor Tang is the Director of National Key Laboratory of Rail Traffic Control and Safety in China. He is the expert group member of the High Technology Research and Development of China (863 Program) in the field of Modern Transportation Technology. He is Fellow of Institution of Railway Signal Engineers. He has served as IPC member for many international conferences. Professor Tang originated the work on system safety, train control. He is the leading author of three books and has also published over 60 papers in international journals and conferences. He has also received Chinese Railway Achievement Prize for his outstanding contribution in the Science and Technology Development for train control.

Title:

Future of Railway Signaling and Train Control

Abstract:

As enabling technologies, Computer, Communication and Control (Called as 3C technologies) have been used widely in railway. In the future, the new development of 3C shall make the railway more livingness. Positioning systems, sensors, computers, communications and advanced control methods are used to collect, process, and disseminate information to improve the safety, security, and operational effectiveness of railways. Over the past years a great number of signaling strategies have been developed in order to keep a safe distance between trains. Technological innovation, especially in signaling and control systems, will result in costs coming down – potentially significantly – and enable train control systems to provide wider operational, non-safety critical applications such as fuel efficiency, asset tracking and passenger information. The wider applications of 3C technology could transform the performance of the railways as decentralized control systems take over from the more rigid centralized command and control structure. More "intelligence" will be distributed throughout the network, with decentralized control evolving to provide traffic management policy and coordination functions. Based on technological advances, the "greener", "smarter" and safer railway transport systems shall be developed that respect the environment and natural resources; and secure and further develop the competitiveness and the leading role. In this presentation, we introduce the communication based train control technology (CBTC) and its application in the world. Some of the key technological trends of train control based on 3C shall be analyzed and explored.