Contents

Welcome

Dear distinguished delegates,

We are pleased to welcome you to 2020 The 8th International Conference on Control, Mechatronics and Automation (ICCMA2020), Due to the severe impact of COVID-19, we have to hold the conferences online, which can not only make a smooth communication and conference holding, but also can protect everyone away from the virus.

The conference brings together researchers looking for opportunities for conversations that cross the traditional discipline boundaries and allows them to resolve multidisciplinary challenging problems. It is the clear intent of the conference to offer excellent mentoring opportunities to participants. Although we cannot meet each other physically, through this online platform, we trust that you will still be able to share the state-of-the-art developments and the cutting-edge technologies in these broad areas.

We'd like to express our sincere gratitude to everyone who has contributed to this conference as its success could have only been achieved through a team effort. A word of special welcome is given to our keynote speakers and invited speakers who are pleased to make contributions to our conference and share their new research ideas with us. They are Prof.dr.ir. J.L. (Just) Herder, ASME fellow, from Delft University of Technology, The Netherlands, Prof. YangQuan Chen from MESA Lab of University of California, Merced, USA, Prof. Peter Plapper from University of Luxembourg, Luxembourg, Prof. Adrian Olaru from University Politehnica of Bucharest, Romania and Asst. Prof. Dr. Rafiq Ahmad from University of Alberta, Canada.

Additionally, our special thanks go to all committee members for their excellent work in reviewing the papers and their other academic support efforts.

We believe that by this excellent conference, you can get more opportunity for further communication with researchers and practitioners with the common interest in this field. We are dedicated to higher and better international conference experiences. We will sincerely listen to any suggestion and comment. Wish you will enjoy this conference, contribute effectively toward it and take back with your knowledge, experiences, contacts and happy memories of these days.

We look forward to meeting you again next time!

Yours sincerely,

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Guideline

✿ Time Zone

Moscow, Russia Local Time (GMT+3)

You're suggested to set up the time on your computer in advance.

✿ Platform: ZOOM

Download

1）https://zoom.com.cn/download (Chinese author option）

2）https://zoom.us/download

Zoom Guideline

http://iccma.org/zoom/

✿ Equipment Needed

- A computer with internet connection and camera
- Headphones

✿ Environment Needed

- A quiet place
- Stable internet connection
- Proper lighting and background

✿ Test Your Presentation

Date: Friday, 6th November, 2020

Prior to the formal meeting, presenters shall join the test room to ensure everything is on the right track. Please check your test time on this program.

✿ Q&A Room

If you have any technical problems, please join the Back Up Zoom for Q&A

Zoom ID: 254 361 6436

Zoom Link: https://zoom.com.cn/j/254 361 6436

✿ Voice Control Rules

- The host will mute all participants while entering the meeting.
- The host will unmute the speakers' microphone when it is turn for his or her presentation.
- Q&A goes after each speaker, the participant can raise hand for questions, the host will unmute the questioner.
- After Q&A, the host will mute all participants and welcome next speaker.

✿ Oral Presentation

- Timing: a maximum of 15 minutes in total, including 2-3 minutes for Q&A. Please make sure your presentation is well timed.
- It is suggested that the presenter email a backup video/slide to conference secretary in case any technical problem occurs by Oct. 30th.

✿ Conference Recording

The whole conference will be recorded. We appreciate you proper behavior and appearance.

* The recording will be used for conference program and paper publication requirements. The video recording will be destroyed after the conference and it cannot be distributed to or shared with anyone else, and it shall not be used for commercial nor illegal purpose. It will only be recorded by the staff and presenters have no rights to record.

Conference at a Glance

* All schedules will process in Moscow, Russia Local Time (GMT+3)

Friday, 6th November– Day 1

6:00-11:45	Committee & Speakers' Test Session	**Zoom ID: 642 7793 7267**
11:00-16:00	Authors' Test Session	**Zoom ID: 617 9568 8782**

Saturday, 7th November– Day 2

9:00-9:10	Opening – **Assoc. Prof. Vsevolod V. Koryanov**	**Zoom ID: 962 9723 6789**
9:10-9:50	Keynote Speech I - **Prof. J.L. (Just) Herder**	**Zoom ID: 962 9723 6789**
9:50-10:30	Keynote Speech II - **Prof. Peter Plapper**	**Zoom ID: 962 9723 6789**
10:50-11:30	Keynote Speech III - **Prof. Maria Pia FANTI**	**Zoom ID: 962 9723 6789**
11:30-12:10	Keynote Speech IV - **Prof. Susumu Hara**	**Zoom ID: 962 9723 6789**
13:00-15:15	**Session 1:** Mechanical and Industrial Engineering	**Zoom ID: 642 7793 7267**
13:00-15:15	**Session 2:** Vehicle design and control	**Zoom ID: 962 9723 6789**
13:00-15:00	**Session 3:** Aviation Engineering and Automotive Systems	**Zoom ID: 617 9568 8782**
16:00-16:40	Keynote Speech V - **Prof. Makoto Iwasaki**	**Zoom ID: 962 9723 6789**
16:40-17:20	Keynote Speech VI - **Prof. Huosheng Hu**	**Zoom ID: 962 9723 6789**
17:40-18:20	Keynote Speech VII - **Prof. YangQuan Chen**	**Zoom ID: 962 9723 6789**

Sunday, 8th November – Day 3

4:00-6:30	**Session 4** Artificial Intelligence and Robots	**Zoom ID: 642 7793 7267**
4:00-6:30	**Session 5** General Machinery Theory and Design	**Zoom ID: 617 9568 8782**
4:00-7:00	**Session 6** Electronics, Electrical Engineering and Communication Engineering	**Zoom ID: 962 9723 6789**
10:00-12:30	**Session 7** Machine Vision and Information Technology	**Zoom ID: 962 9723 6789**
10:00-12:15	**Session 8** Control Theory and Control Technology	**Zoom ID: 642 7793 7267**
10:00-12:15	**Session 9** Robot design and control technology	**Zoom ID: 617 9568 8782**

Detailed Agenda

* All schedules will process in <mark>Moscow, Russia Local Time (GMT+3)</mark>

Friday, 6th – 8th November

Nov. 6th Test Keynote	Test Time Moscow Time	Nov. 7th Formal Keynote	Formal Time Moscow Time
Zoom ID: 642 7793 7267		Zoom ID: 962 9723 6789	
Vsevolod V. Koryanov	10:00-10:15	Vsevolod V. Koryanov	9:00-9:10
J.L. (Just) Herder	10:15-10:30	J.L. (Just) Herder	9:10-9:50
Peter Plapper	10:30-10:45	Peter Plapper	9:50-10:30
Maria Pia FANT	10:45-11:00	Maria Pia FANT	10:50-11:30
Susumu Hara	11:00-11:15	Susumu Hara	11:30-12:10
Makoto Iwasaki	11:15-11:30	Makoto Iwasaki	16:00-16:40
Huosheng Hu	11:30-11:45	Huosheng Hu	16:40-17:20
YangQuan Chen	6:00-6:15	YangQuan Chen	17:40-18:20
Nov. 6th Test Session 1	**Test Time Moscow Time**	**Nov. 7th Formal Session 1**	**Formal Time Moscow Time**
Zoom ID: 617 9568 8782		Zoom ID: 642 7793 7267	
MA007	10:00-10:05	MA007	13:00-13:15
AM2013	10:05-10:10	AM2013	13:15-13:30
SG1-016	10:10-10:15	SG1-016	13:30-13:45
SG1-007	10:15-10:20	SG1-007	13:45-14:00
MA030	10:20-10:25	MA030	14:00-14:15
SG1-013	10:25-10:30	SG1-013	14:15-14:30
AM2015	10:30-10:35	AM2015	14:30-14:45
MA052	10:35-10:40	MA052	14:45-15:00
MA022	10:40-10:45	MA022	15:00-15:15

Detailed Agenda

Nov. 6th Test Session 2	Test Time Moscow Time	Nov. 7th Formal Session 2	Formal Time Moscow Time
Zoom ID: 617 9568 8782		Zoom ID: 962 9723 6789	
MA056	10:00-10:05	MA056	13:00-13:15
MA055	10:05-10:10	MA055	13:15-13:30
MA059	10:10-10:15	MA059	13:30-13:45
MA020	10:15-10:20	MA020	13:45-14:00
MA025	10:20-10:25	MA025	14:00-14:15
MA044	10:25-10:30	MA044	14:15-14:30
MA042	10:30-10:35	MA042	14:30-14:45
AM2025	10:35-10:40	AM2025	14:45-15:00
MA036	10:40-10:45	MA036	15:00-15:15
Nov. 6th Test Session 3	Test Time Moscow Time	Nov. 7th Formal Session 3	Formal Time Moscow Time
Zoom ID: 617 9568 8782		Zoom ID: 617 9568 8782	
MA019	10:00-10:05	MA019	13:00-13:15
MA034	10:05-10:10	MA034	13:15-13:30
AM1006	10:10-10:15	AM1006	13:30-13:45
MA051	10:15-10:20	MA051	13:45-14:00
AM2001	10:20-10:25	AM2001	14:00-14:15
SG1-015	10:25-10:30	SG1-015	14:15-14:30
SG1-019	10:30-10:35	SG1-019	14:30-14:45
SG1-018	10:35-10:40	SG1-018	14:45-15:00

Detailed Agenda

Nov. 6th Test Session 4	Test Time Moscow Time	Nov. 8th Formal Session 4	Formal Time Moscow Time
Zoom ID: 617 9568 8782		Zoom ID: 642 7793 7267	
MA010	5:00-5:05	MA010	4:00-4:15
SG1-008	5:05-5:10	SG1-008	4:15-4:30
MA015	5:10-5:15	MA015	4:30-4:45
MA057	5:15-5:20	MA057	4:45-5:00
AM2005	5:20-5:25	AM2005	5:00-5:15
MA045	5:25-5:30	MA045	5:15-5:30
AM2004	5:30-5:35	AM2004	5:30-5:45
AM2007	5:35-5:40	AM2007	5:45-6:00
AM2012	5:40-5:45	AM2012	6:00-6:15
AM2010	5:45-6:00	AM2010	6:15-6:30
Nov. 6th **Test Session 5**	**Test Time** **Moscow Time**	**Nov. 8th** **Formal Session 5**	**Formal Time** **Moscow Time**
Zoom ID: 617 9568 8782		Zoom ID: 617 9568 8782	
MA061	5:00-5:05	MA061	4:00-4:15
SG1-001	5:05-5:10	SG1-001	4:15-4:30
AM3002	5:10-5:15	AM3002	4:30-4:45
SG1-012	5:15-5:20	SG1-012	4:45-5:00
SG1-002	5:20-5:25	SG1-002	5:00-5:15
MA009-A	5:25-5:30	MA009-A	5:15-5:30
SG1-020	5:30-5:35	SG1-020	5:30-5:45

Detailed Agenda

AM1003	5:35-5:40	AM1003	5:45-6:00
SG1-011	5:40-5:45	SG1-011	6:00-6:15
MA033	5:45-5:50	MA033	6:15-6:30
Nov. 6th **Test Session 6**	**Test Time** **Moscow Time**	**Nov. 8th** **Formal Session 6**	**Formal Time** **Moscow Time**
Zoom ID: 617 9568 8782		**Zoom ID: 962 9723 6789**	
MA049	5:00-5:05	MA049	4:00-4:15
MA054	5:05-5:10	MA054	4:15-4:30
AM1002	5:10-5:15	AM1002	4:30-4:45
AM2006	5:15-5:20	AM2006	4:45-5:00
AM1010	5:20-5:25	AM1010	5:00-5:15
MA001	5:25-5:30	MA001	5:15-5:30
MA003	5:30-5:35	MA003	5:30-5:45
MA023	5:35-5:40	MA023	5:45-6:00
MA004	5:40-5:45	MA004	6:00-6:15
MA017	5:45-5:50	MA017	6:15-6:30
SG1-021	5:50-5:55	SG1-021	6:30-6:45
AM1011	5:55-6:00	AM1011	6:45-7:00
Nov. 6th **Test Session 7**	**Test Time** **Moscow Time**	**Nov. 8th** **Formal Session 7**	**Formal Time** **Moscow Time**
Zoom ID: 617 9568 8782		**Zoom ID: 962 9723 6789**	
AM2014	12:00-12:05	AM2014	10:00-10:15
MA050	12:05-12:10	MA050	10:15-10:30

Detailed Agenda

AM2016	12:10-12:15	AM2016	10:30-10:45
MA053	12:15-12:20	MA053	10:45-11:00
AM2017	12:20-12:25	AM2017	11:00-11:15
MA014	12:25-12:30	MA014	11:15-11:30
MA058	12:30-12:35	MA058	11:30-11:45
MA040	12:35-12:40	MA040	11:45-12:00
MA026	12:40-12:45	MA026	12:00-12:15
AM2020	12:45-12:50	AM2020	12:15-12:30
Nov. 6th **Test Session 8**	**Test Time** **Moscow Time**	**Nov. 8th** **Formal Session 8**	**Test Time** **Moscow Time**
Zoom ID: 617 9568 8782		**Zoom ID: 642 7793 7267**	
MA041	12:00-12:05	MA041	10:00-10:15
MA018	12:05-12:10	MA018	10:15-10:30
MA032	12:10-12:15	MA032	10:30-10:45
MA011	12:15-12:20	MA011	10:45-11:00
MA031	12:20-12:25	MA031	11:00-11:15
MA002	12:25-12:30	MA002	11:15-11:30
MA060	12:30-12:35	MA060	11:30-11:45
MA062	12:35-12:40	MA062	11:45-12:00
MA043	12:40-12:45	MA043	12:00-12:15
Nov. 6th **Test Session 9**	**Test Time** **Moscow Time**	**Nov. 8th** **Formal Session 9**	**Formal Time** **Moscow Time**
Zoom ID: 617 9568 8782		**Zoom ID: 617 9568 8782**	

Detailed Agenda

MA035	12:00-12:05	MA035	10:00-10:15
SG1-010	12:05-12:10	SG1-010	10:15-10:30
MA048	12:10-12:15	MA048	10:30-10:45
SG1-014	12:15-12:20	SG1-014	10:45-11:00
MA021	12:20-12:25	MA021	11:00-11:15
MA029	12:25-12:30	MA029	11:15-11:30
MA038	12:30-12:35	MA038	11:30-11:45
MA1003	12:35-12:40	MA1003	11:45-12:00
MA039	12:40-12:45	MA039	12:00-12:15

Prof.dr.ir. J.L. (Just) Herder, ASME fellow

Delft University of Technology, The Netherlands

Professor, Interactive Mechanisms and Mechatronics

Founding member of IEEE RAS Technical Committee on Mechanisms and Design

Biography: Just Herder is a full professor of Interactive Mechanisms and Mechatronics, Chair of the Mechatronic System Design group and Head of Department of Precision and Microsystems Engineering at Delft University of Technology.

He has widely published in international peer-reviewed journals and conferences and has received several international awards. He is an ASME fellow, board member of several international conferences, associate editor of Mechanism and Machine Theory, and co-founder of Mechanical Sciences. Seven start-up companies have emerged from his research and he holds over a dozen international patents in different areas of mechanism design. He held visiting positions at Laval University, Canada, and at MIT, USA, as a Fulbright Visiting Scholar.

Research Interests

"His research interest is in mechatronic systems with remarkable behavior and their applications. In particular I am interested in those mechanisms that effect or are affected in a special way by interaction with their environment, called Interactive Mechanisms. A long term goal is to establish Distributed Mechatronics, where motion, actuation and sensing are distributed along a compliant structure, with a high level of function integration, trending towards small length scales. To reach this goal, we focus on the development of new technology, methods and techniques, such as static balancing, dynamic balancing, compliant mechanisms, parallel kinematics, self-adaptability, distributed actuation and sensing. Applications fields include precision engineering and mechatronics, robotics, rehabilitation engineering, high-tech industry, MEMS".

◆ Chair, Editorial Board, Mikroniek, ISSN: 0026-3699, 2014-present.

◆ Associate Editor, Mechanism and Machine Theory, ISSN: 0094-114X, 2011-present.

◆ Editor-in-Chief, co-founder, Mechanical Sciences, ISSN: 2191-9151, eISSN: 2191-916X (ISI indexed 2014), 2010-present.

◆ Associate Editor, IEEE Transactions on Neural Systems and Rehabilitation Engineering, ISSN: 1534-4320, 2009-2012.

◆ Associate Editor, ASME Journal of Medical Devices, ISSN 1932-6181, 2006-2013.

Keynote Speakers

Prof. Peter Plapper,
University of Luxembourg, Luxembourg

Prof. Dr.-Ing. Peter Plapper was born in Mannheim, Germany on September 16th 1963. In 1986 he completed his studies on Mechanical Engineering / Design at TU Kaiserslautern with the degree Dipl.-Ing. His doctoral thesis at the laboratory of tool machines (WZL) of RWTH Aachen, Germany was awarded with the Borchers Medal for scientific excellence in 1993.

Since 1994, he worked for Adam Opel and General Motors in different management positions in Manufacturing Engineering (ME) with increasing responsibility. He developed innovative production technologies, implemented tool machines and coordinated the refurbishment of robotic assembly lines. From 1998 until 2002 he joined the Tech Center of GM in Michigan, USA where he shaped the global manufacturing strategy for Body Shop and General Assembly. During his industrial career he worked on many different robot applications, led the installation of assembly lines all European GM vehicle plants and was responsible as HEAD of MANUFACTURING Engineering for the equipment of all shops in plant Russelsheim. Following his assignment as MANAGER ADVANCED TECHNOLOGIES EUROPE Peter Plapper was appointed in 2010 FULL-PROFESSOR for manufacturing engineering to the University of Luxembourg.

Prof. Plapper is member of AIM (European Academy of Industrial Management), VDI (Verein Deutscher Ingenieure), and Luxembourg Materials and Production Cluster Steering Committee. Since 2014 he is the DIRECTOR of the new Master program "Master of Science in Engineering – Sustainable Product Creation".

Keynote Speakers

Prof. Maria Pia FANTI (IEEE Fellow)
Polytechnic of Bari, Italy

Biography: Maria Pia Fanti (IEEE Fellow) received the Laurea degree in electronic engineering from the University of Pisa, Pisa, Italy, in 1983. She was a visiting researcher at the Rensselaer Polytechnic Institute of Troy, New York, in 1999. Since 1983, she has been with the Department of Electrical and Information Engineering of the Polytechnic of Bari, Italy, where she is currently a Full Professor of system and control engineering and Chair of the Laboratory of Automation and Control. Her research interests include discrete-event systems, Petri net, consensus protocols, fault detection, management and modeling of complex systems, such as logistics, production and healthcare systems. She has published +280 papers and two textbooks on these CFP. Prof. Fanti is General Chair of the 2019 IEEE International Conference on Systems, Man, and Cybernetics and was General Chair of the 2011 IEEE Conference on Automation Science and Engineering and of the IFAC Workshop on Dependable Control of Discrete Systems 2009. She is Editor of the IEEE Trans. on Automation Science and Engineering and Associate Editor of the IEEE Trans. on Systems, Man, and Cybernetics: Systems, member at large of the Board of Governor of the IEEE SMC Society, of the AdCom of IEEE Robotics and Automation Society, and Chair of the TC on Automation in Logistics of the IEEE Robotics and Automation Society.

Title: Enabling Technologies of Industry 4.0 for Manufacturing and Logistics Systems

Abstract: Manufacturing and logistics systems of the future are expected to provide resource-efficient, sustainable, safe, equitable and timely handling of goods and management services for the benefit of economy and society, in order to support global supply chains and multimodal transportation systems. The increasing availability of artificial intelligence technologies, such as remote sensing, information and communication tools, big data, blockchain, Internet of Things and machine learning, can capture, elaborate and communicate historical and real-time data and provide opportunities for establishing cloud-based and collaborative logistic and manufacturing ecosystems.

This talk will present how automation science and the enabling technologies of Industry 4.0 have potential to enhance the performance of logistic and manufacturing systems by providing novel, integrated hardware and software solutions.

Moreover, the talk will consider innovative management techniques based on the modern communications, remote sensing and automation technologies, that are suitable for helping stakeholders and decision makers to manage and optimize logistic and manufacturing systems. Hence, the presentation will focus on the design of cloud-based platforms and Decision Support Systems enabling the integration of supply-chain-related transport processes through logistics artificial intelligence solutions. In this context, some results obtained in European projects frameworks will be discussed.

Keynote Speakers

Prof. Susumu Hara

Nagoya University, Japan

Biography: Susumu Hara received his BS, MS, and PhD degrees from Keio University, Tokyo, Japan in 1992, 1994, and 1996, respectively, all in engineering. From 1995 to 2000, he was a Research Fellow with the Japan Society for the Promotion of Science. From 1996 to 2000, he was a Visiting Researcher with the Faculty of Science and Technology, Keio University. From 1998 to 1999, he was a Visiting Scholar with the Department of Mechanical Engineering, University of California, Berkeley. In 2000, he joined the faculty of Toyota Technological Institute, Nagoya, Japan. In 2008, he joined the faculty of Nagoya University, Nagoya, Japan, where he is currently a Professor in the Department of Aerospace Engineering, Graduate School of Engineering. His current research interests include motion and vibration control of mechanical structures and spacecraft, nonstationary control methods, and control problems of man machine systems. He is a member of the JSME, SICE, RSJ, IEEJ, JSPE, IEEE, AIAA, and JSASS.

Title: Control of Self-Standable Motorcycle MOTOROiD

Abstract: This keynote speech discusses the control system design of a novel motorcycle, named "MOTOROiD," possessing a self-stabilizing mechanism. The motorcycle possesses a novel rotary axis, referred to as the active mass center control system (AMCES), which can vary the position of the total center of gravity. This ensures stability during low-speed driving and realizes autonomous straightening from the parked mode. A mathematical controlled object model was prepared, comprising the original motorcycle and a minor feedback control loop aimed at maintaining the minimum stability in waiting mode. For improving robustness, an outer feedback controller was designed, based on the frequency-shaped LQ control theory for the controlled object model. The experimental investigation of such a feedback control problem has not yet been addressed. This work presents an actual implementation of the LQ optimal feedback controller for a MOTOROiD. The efficacy of this controller has been experimentally verified.

Prof. Makoto Iwasaki,

Dr. Eng., IEEE Fellow, Co-Editors-in-Chief for IEEE TIE

Nagoya Institute of Technology, Japan

Biography: Makoto Iwasaki received the B.S., M.S., and Dr. Eng. degrees in electrical and computer engineering from Nagoya Institute of Technology, Nagoya, Japan, in 1986, 1988, and 1991, respectively. Since 1991, he has been with the Department of Computer Science and Engineering, Nagoya Institute of Technology, where he is currently a Professor at the Department of Electrical and Mechanical Engineering. As professional contributions of the IEEE, he has been an AdCom member of IES in term of 2010 to 2019, a Technical Editor for IEEE/ASME TMech from 2010 to 2014, an Associate Editor for IEEE TIE since 2014, a Management Committee member of IEEE/ASME TMech (Secretary in 2016 and Treasurer in 2017), a Co-Editors-in-Chief for IEEE TIE since 2016, a Vice President for Planning and Development in term of 2018 to 2019, respectively. He is IEEE fellow class 2015 for "contributions to fast and precise positioning in motion controller design". He has received the Best Paper Award of Trans of IEE Japan in 2013, the Best Paper Award of Fanuc FA Robot Foundation in 2011, the Technical Development Award of IEE Japan in 2017, the Nagamori Awards in 2017, the Ichimura Prize in Industry for Excellent Achievement of Ichimura Foundation for New Technology in 2018, the Technology Award of the Japan Society for Precision Engineering in 2018, and the Commendation for Science and Technology by the Japanese Minister of Education in 2019, respectively. His current research interests are the applications of control theories to linear/nonlinear modeling and precision positioning, through various collaborative research activities with industries.

Title: "Fast and Precision Motion Control for Industrial Positioning Devices: LMI-Based Command Shaping with Robust Performance"

Abstract: Fast-response and high-precision motion control is one of indispensable techniques in a wide variety of high performance mechatronic systems including micro and/or nano-scale motion, such as data storage devices, machine tools, manufacturing tools for electronics components, and industrial robots, from the standpoints of high productivity, high quality of products, and total cost reduction. In those applications, the required specifications in the motion performance, e.g. response/settling time, trajectory/settling accuracy, etc., should be sufficiently achieved. In addition, the robustness against disturbances and/or uncertainties, the mechanical vibration suppression, and the adaptation capability against variations in mechanisms should be essential properties to be provided in the performance.

The keynote speech presents the fast and precision motion control techniques, where a 2-degrees-of-freedom (2-DoF) control framework is especially handled as one of practical and/or promising approaches to improve the motion performance. Actual issues and relevant solutions for each component in the 2-DoF control structure are clarified, and then, one of examples, a 2-DoF controller design for robust vibration suppression positioning, is presented as an application to industrial high precision positioning devices. In this speech, especially, a command shaping technique with robust performance is discussing for typical industrial manufactural machines, achieving the robustness against mechanical vibration suppression, input saturation, and plant perturbations under the LMI (Linear Matrix Inequality) formulation of their constraint conditions.

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Keynote Speakers

Prof. Huosheng Hu
University of Essex, UK

Biography: Huosheng Hu is a Professor in the School of Computer Science and Electronic Engineering at the University of Essex, U.K. and head of the Robotics and Mechatronics Group. He received the MSc degree in industrial automation from the Central South University in China and the PhD degree in robotics from the University of Oxford in the U.K. His research interests include behaviour-based robotics, human-robot interaction, service robots, embedded systems, data fusion, learning algorithms, mechatronics, and cloud computing. He has published over 500 papers in journals, books and conferences in these areas, and received a number of best paper awards. His Google Scholar citations is 13652, H-index 54, i10-index 260. Prof. Hu is a Fellow of Institute of Engineering & Technology, a Fellow of Institute of Measurement & Control, and a founding member of IEEE Robotics & Automation Society Technical committee on Networked Robots. He has been a Program Chair or a member of Advisory/Organising Committee for many international conferences such as IEEE IROS, ICRA, ICMA, ROBIO conferences. He is currently Editor-in-Chief for International Journal of Automation and Computing, as well as Executive Editor for International Journal of Mechatronics & Automation.

Title: Who will control the world -- Human or Robot?

Abstract: After recent advancement of AI and robotics technologies, autonomous robots are gradually serving us in our home, hospital, office and everywhere. They are intelligent and interactive, inspired from behaviour demonstration of biological systems. Many people are worry about the risk of losing the jobs to robots, and some people thought these intelligent robots may control us in the future. In this talk, I will firstly outline a brief evolution history of AI and robotics technologies, and then their future trend is predicted in some depth. Some milestone robotic projects in the world and the robotics research work done at Essex will be presented, including behaviour modelling, sensor data fusion and behaviour-based control. Finally, my Keynote Speech will deliver a conclusion that humans will control the world and robots will be good servants to us.

Keynote Speakers

Prof. YangQuan Chen

MESA Lab of University of California, Merced, USA

Members of IEEE, ASME, AIAA, ASPRS, AUVSI and AMA

Biography: YangQuan Chen earned his Ph.D. from Nanyang Technological University, Singapore, in 1998. He had been a faculty of Electrical Engineering at Utah State University (USU) from 2000-12. He joined the School of Engineering, University of California, Merced (UCM) in summer 2012 teaching "Mechatronics", "Engineering Service Learning" and "Unmanned Aerial Systems" for undergraduates; "Fractional Order Mechanics", "Linear Multivariable Control", "Nonlinear Controls" and "Advanced Controls: Optimality and Robustness" for graduates. His research interests include mechatronics for sustainability, cognitive process control (smart control engineering enabled by digital twins), small multi-UAV based cooperative multi-spectral "personal remote sensing", applied fractional calculus in controls, modeling and complex signal processing; distributed measurement and control of distributed parameter systems with mobile actuator and sensor networks. He received Research of the Year awards from USU (2012) and UCM (2020), respectively. He was listed in Highly Cited Researchers by Clarivate Analytics in 2018, 2019 and 2020. His lab website is http://mechatronics.ucmerced.edu/ and his publications are at https://scholar.google.com/citations?user=RDEIRbcAAAAJ&hl=en

Title: "Fractional Order Thinking and an Overview of Fractional Order Mechanics"

Abstract: In this talk, I will introduce the basic idea of fractional calculus (differentiation or integration of non-integer orders) and its connections to almost all aspects of modern sciences and engineering when the phenomena or the system is complex. Therefore, I advocate the so called "Fractional Order Thinking (FOT)" and explain when we should use FOT. In particular, I will suggest an interpretation of fractional order derivative by referring to Newton's fluxions as well as non-local models. Then I will make a brief introduction to what I am teaching in Fall 2020 semester "Fractional Order Mechanics" with basic topics covered and an overview of labs I designed for this course. The overall course can be interpreted as the physical interpretation of fractional calculus.

Time Zone Reference

	Time Zone
Canada (Saskatchewan)	**GMT-6**
China	**GMT+8**
Egypt	**GMT+2**
England	**GMT±0**
France	**GMT+1**
Germany	**GMT+1**
India	**GMT+5.5**
Indonesia	**GMT+7**
Japan	**GMT+9**
Luxembourg	**GMT+2**
Malaysia	**GMT+8**
Netherlands	**GMT+2**
New Zealand	**GMT+12**
Pakistan	**GMT+5**
Paris	**GMT+2**
Peru	**GMT-5**
Pakistan	**GMT+5**
Philippines	**GMT+8**
Moscow, Russia	**GMT+3**
Saudi Arabia	**GMT+3**
South Africa	**GMT+2**
South Korea	**GMT+9**
Sri Lanka	**GMT+5.5**
Taiwan	**GMT+8**
Thailand	**GMT+7**
United States (California State)	**GMT-7**