2025 International Annual Conference on Complex Systems and Intelligent Science (CSIS-IAC 2025)

May 16~18, 2025

Shenzhen, China

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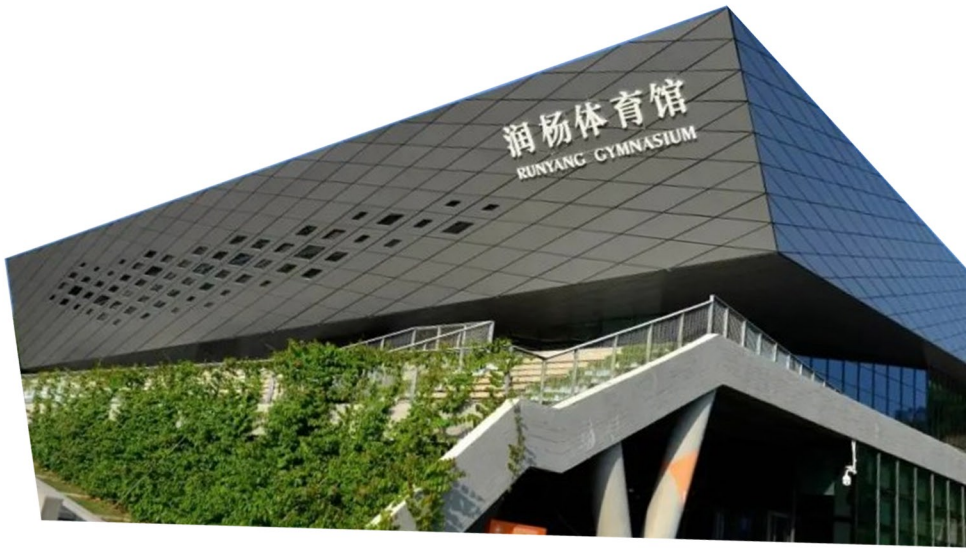
CSIS-IAC 2025

The field of Complex Systems and Intelligent Science has become a focal point of research in recent years. Characterized by numerous interconnected components, complex systems exhibit emergent behaviors that cannot be fully understood when analyzed in isolation. These systems transcend traditional boundaries of physical sciences and engineering, influencing a wide array of disciplines. Notably, the methodologies used to study Complex Systems are equally relevant to Intelligent Science, encompassing areas such as data science, machine learning, and artificial intelligence. The intrinsic link to big data is evident, as complex systems serve as significant sources of large-scale data. Moreover, there is a growing trend toward integrating machine learning and deep learning techniques for modeling, controlling, and managing these systems.

CSIS-IAC 2025 delves into all dimensions of Complex Systems and Intelligent Science, showcasing cutting-edge research in fields such as complex networks, parallel control and management, social computing, intelligent control, learning-based control, machine learning, robotics, and intelligent medicine. The inherently interdisciplinary nature of this domain thrives on collaboration across diverse fields, including mathematics, physics, computer science, engineering, social sciences, humanities, and political sciences.

SUSTech

南方科技大学
SOUTHERN UNIVERSITY OF SCIENCE AND TECHNOLOGY



Southern University of Science and Technology (SUSTech) is an innovation-oriented public university founded by Shenzhen government in the background of China's higher education reform. It aspires to be a model and pioneer for promoting higher education reform. It is committed to serving the mission of promoting Shenzhen as a modern, international, and innovative city and China as a creative country. SUSTech is widely regarded as a trailblazer and innovator in advancing China's higher education. It was officially approved by the Ministry of Education in April 2012. SUSTech bears the responsibility for exploring and developing a modern university system with Chinese characteristics to serve as a model for cultivating innovative talents. SUSTech aims at a globally renowned university that contributes to the advancement of science and technology. It nurtures promising and creative leaders who excel in interdisciplinary research and creating knowledge for the world.

SUSTech draws on the experience of world-class science and engineering universities for its disciplinary establishment and governance. It focuses on science, engineering, and medicine in conjunction with distinctive disciplines, including business, humanities, and social sciences. SUSTech offers undergraduate and postgraduate education while conducting research in a series of innovative disciplines. All of those practices shape SUSTech into a think tank for social progress and a generator of new knowledge and new technology. SUSTech is building interdisciplinary research centers to generate new scientific and technological wisdom in cross-disciplinary fields such as artificial intelligence, life sciences, Internet of things, robotics, new energy, and intelligent manufacturing. In the spirit of "For Truth, Innovation, Reform and Excellence with Diligence and Courage," SUSTech highlights "research, innovation, and entrepreneurship" and dedicates to facilitating innovative projects across China and turning Shenzhen into an innovative, modern, and international metropolis. SUSTech also seeks to become an international high-level research university that gathers first-class faculty and nurtures top-notch innovative talents. It aims to produce internationally recognized academic achievements and advance scientific and technological applications.

广东省全驱系统控制理论与技术重点实验室

广东省全驱系统控制理论与技术重点实验室是2024年依托南方科技大学获批建立的省级重点实验室，主要研究控制系统分析和设计的全驱系统方法。实验室负责人为全驱系统方法创始人段广仁院士，研究团队成员包括中国科学院院士1人、海外院士3人、 IEEE Fellow 5人、国家杰青3人、教育部特聘专家4人、国家特聘教授6人（包括青年2人）、海外优青6人。团队中有若干位全驱系统控制方法的先驱和一批国际控制界知名学者，具有雄厚的理论基础。同时，实验室也具有优越的实验环境和充分的条件保障。

全驱系统控制理论体系突破了状态空间方法难以处理的复杂非线性、时变性、时滞特性和非完整特性的束缚，解决了复杂系统的鲁棒镇定、自适应控制、鲁棒自适应控制、最优控制、预测控制、跟踪控制、抗干扰控制、离散时间系统控制等问题，近年来在控制学术界产生了重大反响。

本实验室将进一步在基于高阶全驱系统方法的建模及控制系统分析和设计方面开展深入、系统的研究，更有效地解决状态空间方法难以处理的复杂非线性系统、时变非线性系统、时滞非线性系统、非光滑非线性系统以及非完整系统的分析和控制问题；进一步构建复杂非线性系统的高阶全驱系统理论体系，引领国际控制理论和控制技术的发展，实现控制理论方法论从状态空间方法到全驱系统方法的国际性重大转折；打造控制领域世界领先的研究团队，培养世界级领军科学家，提升我国在国际控制界的地位和影响。同时，将基于高阶全驱系统理论解决我国当前机器人控制和航天器控制等领域中的瓶颈问题，提出机器人和航天器控制的一批先进方法，形成一批新型的应用控制技术，为我国控制工程领域的科学发展和技术进步提供支撑，实现国家控制工程技术的快速发展，促进大湾区高精尖自动化产业水平的大幅度提升。

CASIA

中国科学院自动化研究所
INSTITUTE OF AUTOMATION CHINESE ACADEMY OF SCIENCES

The Institute of Automation of the Chinese Academy of Sciences (CASIA) was established in 1956. With intelligent science and technology as the main orientation, it is the overall leading unit of the "Artificial Intelligence Innovation Institute" first established by the Chinese Academy of Sciences. It is the first national research institution to carry out brain-inspired intelligence research in China and the leading institute for the first School of Artificial Intelligence in China.

For over sixty years, CASIA has made great contributions to national economy construction, social progress, scientific and technological development and national security. In the initial stage of China, CASIA pioneered control science and engineering of China, making historical contributions to "Two Bombs & One Satellite". During the period of Chinese economic reform, CASIA opened up the new area in pattern recognition and intelligent information processing in China. From the 1990s, CASIA started to focus on Artificial Intelligence base on control science.

CASIA focus on research of intelligent science and technology. The institute has formed distinct scientific advantages and technical characteristics in the fields of intelligent integration of complex systems, pattern recognition, machine learning, computer vision, speech and language information processing, brain-inspired intelligence, intelligent robots, intelligent systems and intelligent chips. It has a complete intelligent technology innovation chain from R&D to technology transfer. The institute has 14 research departments, including two national laboratories, one national engineering center, one CAS key laboratory and 5 joint labs globally. Up to the end of 2021, the institute has 1105 full-time staff, of which 118 are professors and senior engineers, 305 associate professors and associate senior engineers. CASIA has 3 CAS Members; 1 TWAS Member; 14 IEEE fellows and 16 winners of National Science Fund for Distinguished Young Scholars. For education and training, the institute currently has 1157 post-graduate students, including 573 PhD students and 584 Master students, as well as 65 post-docs. CASIA is the affiliated unit of Chinese Association of Automation and China Society of Image and Graphics. The institute sponsors three academic journals: IEEE/CAA Journal of Automatica Sinica (SCI Journal), ACTA Automatica Sinica and Machine Intelligence Research.

IEEE is the world’s largest technical professional organization dedicated to advancing technology for the benefit of humanity. IEEE and its members inspire a global community through its highly cited publications, conferences, technology standards, and professional and educational activities.

IEEE has 39 technical Societies and eight Technical Councils representing a wide range of IEEE technical interests, publishes more than 200 transactions, journals, and magazines, sponsors more than 2,000 conferences and events in 190 countries while contributing over 4 million total conference papers to IEEE Xplore since 1936, with more than 200,000 new papers added annually.

There are over 460,000 IEEE members in over 190 countries, more than 66 percent of whom are from outside the United States. IEEE members are engineers, scientists, and allied professionals whose technical interests are rooted in electrical and computer sciences, engineering, and related disciplines.

As the world's largest technical professional organization, IEEE offers a number of ways to get involved with technical and local communities. These communities are active participants in research and authorship, conferences, and important conversations about today's most relevant technical topics locally and globally.

Venue

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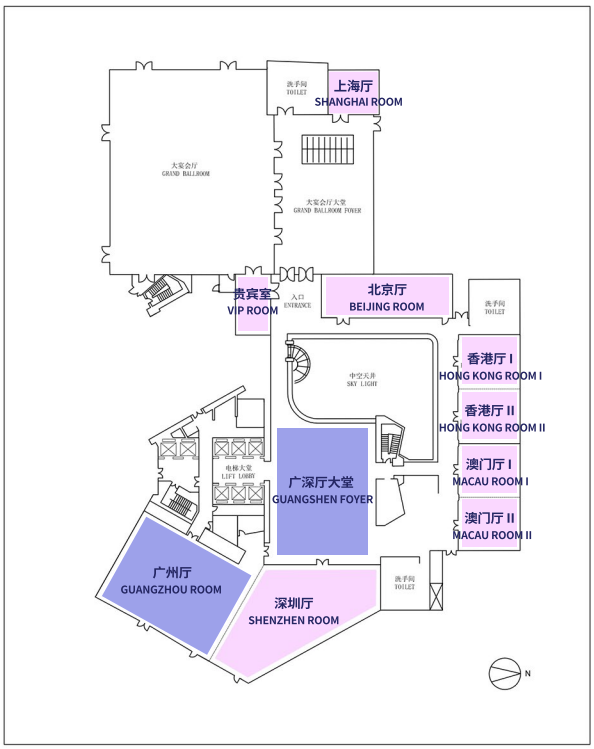
SHANGRI-LA



2025年5月16日 星期五 14:30-19:30 酒店一楼大堂开放注册签到服务台。
2025年5月17日至5月18日，请移步至三楼广深厅大堂会议服务台，注册及签到。
任何疑问，均可咨询现场志愿者。

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2025 International Annual Conference on Complex Systems and Intelligent Science
CSIS-IAC 2025 Program at a Glance http://www.csisiac.org

Friday, May 16, 2025

Hotel Lobby, 酒店一楼大堂	Hong Kong Room I 三楼香港厅I	Hong Kong Room II 三楼香港厅II		Session color legend, 分会场颜色对应				
14:30 – 19:30 Registration desk open	15:00 – 18:00 2025年度深圳市控制理论与智能系统重点实验室学术委员会会议, 主任：段广仁	14:00 – 15:30 IEEE Systems Council Chapter meeting, Chairs: Kemi Ding, Xiang Xu, Yong Xu 16:00 – 18:00 IEEE Signal Processing Society Chapter meeting, Chair: Kui Jia	Plenary session	Invited session	Regular session	Sepcial session	IEEE activities	其它活动

Saturday, May 17, 2025

8:30 – 8:50	Opening ceremony (Guangzhou Room, 三楼广州厅)								
8:50 – 9:40	Plenary lecture 1: "Industrial Artificial Intelligence and Automation" by Weihua Gui, Chair: Chenghong Wang								
9:40 – 10:10	Coffee break (Guangshen Foyer, 三楼广深厅大堂)								
10:10 – 11:00	Plenary lecture 2: "Sub-fully Actuated Systems and Dynamical System Control" by Guangren Duan, Chair: Yongduan Song								
11:00 – 11:50	Plenary lecture 3: "From Graph Theory to Probe Computers" by Jin Xu, Chair: Derong Liu								
12:00 – 13:20	Lunch (Grand Ballroom, 三楼大宴会厅)								
13:30 – 15:30	Beijing Room 三楼北京厅	Hong Kong Room I 三楼香港厅I	Hong Kong Room II 三楼香港厅II	Macau Room I 三楼澳门厅I	Macau Room II 三楼澳门厅II	VIP Room 三楼贵宾室	Shanghai Room 三楼上海厅	Shenzhen Room 三楼深圳厅	Guangshen Foyer 三楼广深厅大堂
	SaA01 - Special Session: Modeling and Intelligent Control of Complex Systems (1), Chairs: Feiqi Deng, Shuangyun Xing, Xueyan Zhao	SaA02 - Special Session: Intelligent Marine Vehicle Control Techniques, Chairs: Weiwei Bai, Shan Xue	SaA03 - Regular Session: Adaptive Dynamic Programming and Reinforcement Learning (1), Chairs: Yuling Liang, Yancai Xu	SaA04 - Regular Session: Robotics, Navigation and Control, Chairs: Fuxiao Tan, Junkai Ren	SaA05 - Regular Session: Data-based Learning, Control and Optimization, Chairs: Yiwen Qi, Dong Liu	IEEE EMC/AP Societies Chapter meeting, Chairs: Nan Li, Jiyu Wu, Lie Liu	NSFC重点支持区域创新发展联合基金项目启动会, 负责人：孔贺	IEEE Young Professionals Group meeting, Chairs: Jinxu Xu, Liangming Chen, Jian-Fang Hu, Yuan Liu	SaPoster - Poster Session 1, Chairs: Dongsheng Guo, Xiumei Zhang
15:30 – 16:00	Coffee break (Guangshen Foyer, 三楼广深厅大堂)								
16:00 – 18:00	SaB01 - Special Session: Adaptive Intelligent Control for Complex Control Systems, Chairs: Jinna Li, Ding Wang, Huiyuan Shi	SaB02 - Special Session: Intelligent Fault-tolerant Control and Optimization for Complex Systems, Chairs: Fei Teng, Jian Sun, Tieshan Li	SaB03 - Regular Session: Adaptive Dynamic Programming and Reinforcement Learning (2), Chairs: Zhinan Peng, Mingduo Lin	SaB04 - Regular Session: Autonomous Systems and Control, Chairs: Dehua Zhang, Xin Hu	SaB05 - Regular Session: Artificial Intelligence Algorithm and Applications, Chairs: Chuang Gao, Shiqi Liu	SaB06 - Regular Session: Machine Learning-based Optimization, Control and Decision-making, Chairs: Ziyang Wang, Ke Wang	IEEE Control Systems Society Chapter meeting, Chairs: Feiqi Deng, Zhiyun Lin, Renquan Lu, Xueyan Zhao	IEEE Power and Energy Society Chapter meeting, Chairs: Shukai Xu, Wenhu Tang, Jizhong Zhu	
18:30 – 20:30	Dinner and socializing time (Grand Ballroom, 三楼大宴会厅)								

Sunday, May 18, 2025

8:20 – 8:30	Short discussion before plenary (Guangzhou Room, 三楼广州厅)							
8:30 – 9:20	Plenary lecture 4: "Efficient and Highly Connected Networks" by Chenghong Wang, Chair: Tingwen Huang							
9:20 – 10:10	Plenary lecture 5: "Parallel Control/Decision and Complexity Science: Foundation Intelligence for Control and Infrastructure Models of Automation Beyond LLMs" by Fei-Yue Wang, Chair: Derong Liu							
10:10 – 10:30	Coffee break (Guangshen Foyer, 三楼广深厅大堂)							
10:30 – 11:20	Plenary lecture 6: "Intermittent Sensoring and Control for Energy, Communication, and Computation Savings: Recent Developments and Future Trends" by Yongduan Song, Chair: Zhiyun Lin							
11:20 – 12:10	Plenary lecture 7: "On the Differences Between MBC and DDC Theories with Evaluation Criterion" by Zhongsheng Hou, Chair: Guo-Ping Liu							
12:10 – 13:20	Lunch (Grand Ballroom, 三楼大宴会厅)							
13:30 – 15:30	Beijing Room 三楼北京厅	Hong Kong Room I 三楼香港厅I	Hong Kong Room II 三楼香港厅II	Macau Room I 三楼澳门厅I	Macau Room II 三楼澳门厅II	VIP Room 三楼贵宾室	Shanghai Room 三楼上海厅	Guangshen Foyer 三楼广深厅大堂
	SuA01 - Special Session: Modeling and Intelligent Control of Complex Systems (2), Chairs: Shuangyun Xing, Xueyan Zhao, Feiqi Deng	SuA02 - Special Session: Neural Networks-Based Adaptive Learning Control for Nonlinear Systems, Chairs: Chong Liu, Hanguang Su, Yanhong Luo	SuA03 - Regular Session: Adaptive Dynamic Programming and Reinforcement Learning (3), Chairs: Yongwei Zhang, Yi Zhang	SuA04 - Regular Session: Neural Network-based Control, Chairs: Xiangmin Tan, Haijun Jiang	SuA05 - Regular Session: System Analysis for Intelligent Agents, Chairs: Qiao Lin, Junyang Li	SuA06 - Regular Session: Complex Networks and Social Systems, Chairs: Yunong Zhang, Jin Jiang	IEEE Intelligent Transportation Systems Society Chapter meeting, Chairs: He Kong, Huan Yu, Xinhu Zhang	SuPoster - Poster Session 2, Chairs: Na Dong, Shenquan Wang
15:30 – 16:00	Coffee break (Guangshen Foyer, 三楼广深厅大堂)							
16:00 – 18:00	Beijing Room, 三楼北京厅			Macau Room I, 三楼澳门厅I		VIP Room 三楼贵宾室	Shanghai Room 三楼上海厅	
	Invited Lectures (1) Chair: Yanhong Luo 16:00 – 16:30: Biao Luo "Principles and Recent Advances of Off-policy Reinforcement Learning for Optimization Control" 16:30 – 17:00: Xueyan Zhao "Necessary and Sufficient Conditions for Asymptotic Stability of Stochastic Systems With Discrete-Time Feedbacks and Applications" 17:00 – 17:30: Liangming Chen "Multi-robot Cooperative Localization and Swarm Formations based on Angle Rigidity Theory" 17:30 – 18:00: Dengxiu Yu "Proactive Situation Prediction of Clustered Targets under Incomplete Information: Key Techniques and Applications"			Invited Lectures (2) Chair: Bo Zhao 16:00 – 16:30: Meng Zhang "Reinforcement Learning Driven Power System Frequency Control" 16:30 – 17:00: Zhuo Wang "Stability and Stabilizability of Interval Systems and Their Applications" 17:00 – 17:30: Yisheng Lv "Decentralized Autonomous Operation for Parallel Traffic Management and Control" 17:30 – 18:00: Ning Sun "Intelligent Perception and Control for Underactuated Cranes With Applications"		2025 IEEE Guangzhou Section and Chapter Chairs meeting, Chairs: Derong Liu, Xiuyin Zhang, Weineng Chen	IEEE Transportation Electrification Council Chapter meeting, Chairs: Hang Zhao, Yiming Ma, Dianxun Xiao	
18:30 – 20:30	Banquet and award ceremony (Guangzhou Room, 三楼广州厅)							

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Nianyin Zeng, Xiamen University, China
Dehua Zhang, Henan University, China
Jianjun Zhang, South China Agricultural University, China
Ke Zhang, Nanjing University of Aeronautics and Astronautics, China
Kun Zhang, Beihang University, China
Lei Zhang, Sichuan University, China
Qichao Zhang, University of Chinese Academy of Sciences, China
Rui Zhang, Northwestern Polytechnical University, China
Shunchao Zhang, Guangdong University of Finance, China
Xiangwen Zhang, Guilin University of Electronic Technology, China
Xiumei Zhang, Changchun University of Technology, China
Yangming Zhang, Hangzhou Dianzi University, China
Yinyan Zhang, Jinan University, China
Yongwei Zhang, South China Agricultural University, China
Xudong Zhao, Dalian University of Technology, China
Zhijia Zhao, Guangzhou University, China
Fenghua Zhu, University of Chinese Academy of Sciences, China
Yanzheng Zhu, Shandong University of Science and Technology, China
Xiaoyu Zou, China University of Mining and Technology, China
Baig Zubair, Edith Cowan University, Australia

PLENARY LECTURES

Guangren Duan

Southern University of Science and Technology

Sub-fully Actuated Systems and Dynamical System Control

10:10–11:00, May 17, 2025, Guangzhou Room

Guangren Duan is Fellow of CAA, IEEE and IET, and Academician of the Chinese Academy of Sciences. He received his Ph.D. in Control Science and Engineering from Harbin Institute of Technology (HIT), Harbin, China, in 1989. After a two-year post-doctoral experience at the same university, he became professor of control systems theory at HIT in 1991. He visited the University of Hull, the University of Sheffield, and the Queen's University of Belfast, UK, from December 1996 to October 2002. He is the founder and presently the Director of the Center for Control Theory and Guidance Technology at HIT. In 2021, he also established the automation faculty at the Southern University of Science and Technology (SUSTech), Shenzhen, China, and is presently serving as the Dean for the School of Automation and Intelligent Manufacturing at SUSTech. He is the author and co-author of five books and over 600 SCI-indexed publications. His research interests include both linear and nonlinear control, and their applications in spacecraft and robotics. Particularly, he established in 2021 the fully actuated system (FAS) approach for control, and has set up the technical committees on FAS Theory and Applications (FASTA) with the Chinese Association of Automation and the Asian Control Association, respectively, in 2022 and 2024. He has been general chairs for several international conferences including the 23rd IFAC Symposium on Automatic Control in Aerospace, and has been invited to give plenary talks at more than 40 international conferences, including IFAC TDS 2021, IEEE ICRA 2021, IEEE IECON 2023, SICE-ICASE 2006, SICE 2014, CCC 2021, and CAC 2024.

Abstract: The fully actuated system (FAS) approach was proposed by discovering the mathematically generalized FAS model of dynamical systems. Although a traditional non-FAS cannot be converted into a physical FAS, it can be converted into a mathematically generalized FAS. Moreover, like a physical FAS, the control of a mathematically generalized FAS can also be easily realized. Such facts and logic naturally motivate the so-called FAS approach that solves control systems design based on generalized FAS models. As a matter of fact, the state-space models are convenient for obtaining the state vectors (state responses or estimates), but not the control vectors, while the FAS models are those from which the control vectors can be explicitly solved out, and thus can best perform the control. The FAS approach has found its great power in dealing with control of complicated nonlinear dynamical systems, including the time-varying nonlinear systems with time-varying delays, constrained systems and complex nonholonomic systems. Particularly, the International Conference on Fully Actuated System Theory and Applications (FASTA) has been held three times, with FASTA 2024 attracting more than 610 participants, and the upcoming one, FASTA 2025, attracting more than 650 submissions. In this talk, the backgrounds and the development of the FAS approach are briefly outlined, with an emphasis laid on sub-FAS models and sub-stabilization theory, together with some practical applications of the FAS approach.

Weihua Gui

Central South University

Industrial Artificial Intelligence and Automation

8:50–9:40, May 17, 2025, Guangzhou Room

Weihua Gui is an academician of the Chinese Academy of Engineering. He graduated from the Central South Institute of Mining and Metallurgy in 1975, earned a master's degree in Industrial Automation from the same institute in 1981, and spent two years as a visiting scholar in Automatic Control at the University of Duisburg, Germany, in 1986. He previously served as Dean of the School of Information Science and Engineering at Central South University and currently holds the positions of Director of the Academic Committee of Central South University, Director of the Control Engineering Research Institute, Director of the Ministry of Education's Engineering Research Center for Nonferrous Metallurgical Automation, Vice Chairman of the Chinese Association of Automation, Chairman of the Process Control Committee of the Chinese Association of Automation, and Honorary Chairman of the Hunan Association of Automation. For decades, he has dedicated himself to research on the theory, technology, and engineering applications of process control in industrial production. Addressing the technical challenges of enterprise informatization and intelligent manufacturing in process industries, he established a theoretical and methodological framework centered on intelligent integration for the modeling, control, and optimization of complex nonferrous metallurgical processes. His achievements have been widely applied in major enterprises in the nonferrous metals industry, yielding significant economic and social benefits, and making important contributions to the rapid development of China's process industries, particularly in advancing automation technology and independent innovation. His research has earned him three National Science and Technology Progress Awards (Second Class), one National Technology Invention Award (Second Class), and 18 provincial and ministerial-level science and technology awards. He has published over 400 academic papers, with 238 indexed by EI and SCI. He has received prestigious honors such as the Ho Leung Ho Lee Foundation Prize for Scientific and Technological Progress, the Hunan Guangzhao Science and Technology Award, the Lifetime Achievement Award in Chinese Process Control, the Process Control Technology Contribution Award, and the Yang Jiachi Science and Technology Award. Additionally, he has authored five academic monographs. Over his 30-year teaching career, he has been recognized with titles including National Model Teacher in Education, National Exemplary Teacher, National Outstanding Teacher, National Outstanding Science and Technology Worker, Model Worker of China's Nonferrous Metals Industry, and Outstanding Science and Technology Worker in China's Nonferrous Metals Industry.

Abstract: Automation and artificial intelligence (AI) are deeply intertwined both theoretically and in applications, together driving the high-quality development of manufacturing. This report begins by defining automation and AI, and exploring their meanings and research scopes. It then focuses on smart manufacturing—a key direction for AI applications—and discusses the challenges faced in empowering smart manufacturing with large-scale AI models like DeepSeek. These challenges include the integration of high-quality industrial knowledge, collaborative decision-making between domain large models and specialized small models, and the establishment of efficient and trustworthy validation mechanisms for industrial large models. Additionally, the report briefly introduces the embodied intelligent governance domain large model, proposed for the first time by our team, outlining its theoretical framework, design approach, and preliminary results.

Zhongsheng Hou

Qingdao University

On the Differences Between MBC and DDC Theories with Evaluation Criterion

11:20–12:10, May 18, 2025, Guangzhou Room

Zhongsheng Hou received his Ph. D. degree from Northeastern University in 1994, postdoc from Harbin Institute of Technology in 1997, and visiting scholar from Yale University in 2002-2003. He was formerly the director and second-level professor of the Department of Automatic Control of Beijing Jiaotong University, and was selected as a "Leading talent" of the Outstanding 100 People Program of Beijing Jiaotong University. He is currently the chief professor of Qingdao University and the Dean of the Institute of Systems Science. IEEE Fellow; Chinese Association of Automation (CAA Fellow); Member, IFAC Technical Committee "Adaptive and Learning Systems"; Member, IFAC Technical Committee "Transportation Systems". Founding Director of the "Data-Driven Control, Learning and Optimization" Professional Committee of the Chinese Society of Automation; He founded the IEEE Data Driven Control and Learning Systems Conference and served as the general Chairman of the conference. Former or current editorial board member of "Acta Automatica Sinica", "Control Theory and Applications", "Control and Decision", "Systems Science and Mathematics"; He was a guest editor of the IEEE Neuronal Networks and Learning Systems Journal on "Data-Based Control, Decision, Scheduling and Fault Diagnosis". Guest editor of the IEEE Industrial Electronics Conference special issue "Data-Driven Control and Learning Systems".

Abstract: This talk includes four parts. The first part will focus on the essential differences between model based control (MBC) and the data driven control (DDC) methods from perspectives of I/O relationships they use. The second part will introduce a novel tool for DDC control system design, namely, the dynamic linearization data model (DLDM). The third part will briefly present the framework of the DLDM-based model free adaptive control (MFAC), especially the relationships between MFAC and the traditional adaptive control as well as PID control, according to a new paradigm evaluation criterion, that is, originality, integrity, correctness, superiority, and applicability. The last part is the conclusion.

Yongduan Song

Chongqing University

Intermittent Sensoring and Control for Energy, Communication, and Computation Savings: Recent Developments and Future Trends

10:30–11:20, May 18, 2025, Guangzhou Room

Yongduan Song is a Fellow of IEEE, AAIA, and CAA. He held a tenured full professor position with North Carolina Agricultural and Technical State University, Greensboro, NC, USA, from 1996 to 2008, and a Langley Distinguished Professor position with the National Institute of Aerospace, Hampton, VA, USA, from 2005 to 2008. He was one of the six Langley Distinguished Professors with the National Institute of Aerospace (NIA), and the Founding Director of the Center for Cooperative Systems with NIA. He is currently the Director of the Institute of Artificial Intelligence, Chongqing University, Chongqing, China. Dr. Song is a leading researcher in neural networks (NN) based adaptive control, significantly contributing to both NN theory methods and engineering applications. He is very active as associate editors for top IEEE journals, including IEEE Trans. on Neural Networks, IEEE Trans. on Automatic Control, IEEE Trans. Systems, Man, and Cybernetics, IEEE Trans. on Intelligent Transportation Systems, and IEEE Trans. on Cognitive and Developmental Systems. As a scientific leader in the field of systems and control, he has been serving on various national and international technical committees. Dr. Song has made original contributions in neural network adaptive control of nonlinear systems with real world applications, which can be assessed by his publications (over 300 papers) in prestigious international journals, including IEEE T-NNLS, IEEE T-FS, IEEE T-SMC, IEEE T-Cybernetics, IEEE T-AC, IEEE T-IE and Automatica. He authored/co-authored 11 books in the field of control and artificial intelligence. He also held over 80 patents, and has given numerous keynote speeches and invited talks, chaired several conferences. He is the Editor-in-Chief of IEEE Transactions on Neural Networks and Learning Systems.

Abstract: Utilizing discontinuous or intermittent feedback signals to generate intermittent control actions for nonlinear dynamic systems is both an intriguing and challenging topic. This presentation will provide an overview of recent advancements in various methods for intermittent sensing and control, with a particular focus on dynamic event-triggering techniques. Additionally, some of the latest findings from the speaker' s research group will be discussed.

Chenghong Wang

Chinese Association of Automation

Efficient and Highly Connected Networks

8:30–9:20, May 18 2025, Guangzhou Room

Chenghong Wang is a Researcher at the National Natural Science Foundation of China (NSFC). He received his Ph.D. degree from the Institute of Automation, Chinese Academy of Sciences, in July 1997, and engaged in postdoctoral research and served as an associate professor in the Academy of Mathematics and Systems Science (AMSS) of Chinese Academy of Sciences from August 1997 to October 1999. He worked in the Information Science Division of NSFC from November 1999 to August 2015, holding important positions including Project Director, Deputy Director of Automation Department, and Director of the Automation Department. Since September 2015, he serves as the Vice President of the Chinese Association of Automation (CAA). Dr. Wang's main research areas include control theory and its applications, system reliability theory and its applications, and development strategies for automation discipline. He has published over 50 academic papers and has co-authored one academic monograph. He is a Fellow of CAA.

Abstract: This report defines the symmetry of simple undirected graphs and provides its measurement metrics for the first time in academia. The Wiener index of the simple undirected graphs is extended to a cost index, based on which the efficient and highly connected networks are defined. The existence of the efficient and highly connected networks is proved, whose construction method is discussed, and several efficient and highly connected networks are constructed. These results have significant innovation and potential application values in the field of various information networks and control network designs.

Fei-Yue Wang

Obuda University, Budapest, Hungary and The State Key Laboratory for Management and Control of Complex Systems, Beijing, China

Parallel Control/Decision and Complexity Science: Foundation Intelligence for Control and Infrastructure Models for Automation Beyond LLMs

9:20–10:10, May 18, 2025, Guangzhou Room

Fei-Yue Wang received his Ph.D. degree in computer and systems engineering from the Rensselaer Polytechnic Institute, Troy, NY, USA, in 1990. He joined The University of Arizona in 1990 and became a Professor and the Director of the Robotics and Automation Laboratory and the Program in Advanced Research for Complex Systems. In 1999, he founded the Intelligent Control and Systems Engineering Center at the Institute of Automation, Chinese Academy of Sciences (CAS), Beijing, China, under the support of the Outstanding Chinese Talents Program from the State Planning Council, and in 2002, was appointed as the Director of the Key Laboratory of Complex Systems and Intelligent Science, CAS, and the Vice President of Institute of Automation, CAS, in 2006. He founded the CAS Center for Social Computing and Parallel Management in 2008, and became the State Specially Appointed Expert and the Founding Director of the State Key Laboratory for Management and Control of Complex Systems, in 2011. His current research focuses on methods and applications for parallel intelligence, social computing, and knowledge automation. He is a Fellow of IEEE, ACM, INCOSE, IFAC, ASME, and AAAS. In 2007, he received the National Prize in Natural Sciences of China, numerous best papers awards from IEEE Transactions, and became an Outstanding Scientist of ACM for his work in intelligent control and social computing. He received the IEEE ITS Outstanding Application and Research Awards in 2009, 2011, and 2015, respectively, the IEEE SMC Norbert Wiener Award in 2014, and became the IFAC Pavel J. Nowacki Distinguished Lecturer in 2021. Since 1997, he has been serving as the General or Program Chair of over 30 IEEE, INFORMS, IFAC, ACM, and ASME conferences. He was the President of the IEEE ITS Society from 2005 to 2007, the IEEE Council of RFID from 2019 to 2021, the Chinese Association for Science and Technology (USA) in 2005, the American Zhu Kezhen Education Foundation from 2007 to 2008, the Vice President of the ACM China Council from 2010 to 2011, the Vice President and the Secretary General of the Chinese Association of Automation from 2008 to 2018, the Vice President of IEEE Systems, Man, and Cybernetics Society from 2019 to 2021. He was the Founding Editor-in-Chief (EiC) of the International Journal of Intelligent Control and Systems from 1995 to 2000, IEEE ITS Magazine from 2006 to 2007, IEEE/CAA Journal of Automatica Sinica from 2014 to 2017, China's Journal of Command and Control from 2015 to 2021, and China's Journal of Intelligent Science and Technology from 2019 to 2021. He was the EiC of the IEEE Intelligent Systems from 2009 to 2012, IEEE Transactions on Intelligent Transportation Systems from 2009 to 2016, IEEE Transactions on Computational Social Systems from 2017 to 2020. Currently, he is the President of CAA's Supervision Council, and the EiC of IEEE Transactions on Intelligent Vehicles.

Abstract: This report outlines a reference framework and its basic decision making processes for control organization, operation, and optimization that are orientated for knowledge automation and automation of intelligence in the era of intelligent industries beyond Large Language Models, AI agents, Generative Intelligence, and Embedded/Embodied Intelligence. We will introduce the concepts of the foundation intelligence and infrastructure models with corresponding discussion on their roles in future intelligent control and smart automation via parallel decision-making and control of parallel intelligence through the integration and fusion of Algorithmic Intelligence, Agentic Intelligence, and Autonomous Intelligence, as well as Blockchain Intelligence, Smart Contracts, DAOs and DeSci in Cyber-Physical-Social Systems (CPSS).

Jin Xu

Peking University

From Graph Theory to Probe Computers

11:00–11:50, May 17, 2025, Guangzhou Room

Jin Xu is a Professor at Peking University, holding dual doctoral degrees in both science and engineering. His research encompasses neural networks, bioinformatics, computer theory, and algorithms. With over 400 papers published, he has also authored five monographs and translated one. He has been recognized as the primary investigator, earning one second prize from the National Natural Science Award, two first prizes from the Ministry of Education Natural Science Award, and one first prize from the Hubei Province Natural Science Award. Jin Xu has led numerous projects, including Key Projects of the National Natural Science Foundation, major international cooperation projects, and national key research and development plans. He has chaired the 1st, 2nd, 4th, 5th, 7th, and 8th International Conference on Bioinformatics and served as editor-in-chief of one journal, along with deputy editor-in-chief roles in two others. Currently, he holds positions as Deputy Director of the Circuits and Systems Society at the China Institute of Electronics and Vice Chair of the Cloud Computing and Big Data Applications Technical Committee at the China Institute of Communications. Invited as a keynote speaker at the 2022 Annual Meeting of the Information Division of the Chinese Academy of Sciences, Jin Xu has also contributed as a field expert in the Science and Technology Commission and held leadership roles in various professional societies, including President of the Operations Research Society of Hubei Province and Vice President of the Operations Research Society of Beijing. Additionally, he has served as a member of the Advisory Committee on Network Space Security Education for the Ministry of Education.

Abstract: The current electronic computers struggle to efficiently solve the so-called "combinatorial explosion" problems. A notable characteristic of such problems is that the required computational effort increases exponentially as the problem size. They fall under the category of NP-complete problems, including resource allocation, logic circuit design, path planning, protein structure prediction, code-breaking, and many more. Fortunately, all NP-complete problems are fundamentally equivalent. This means that by thoroughly studying one type of NP-complete problem, we can generalize the findings to all other NP-complete problems. We will present on graph coloring—a classic NP-complete problem—covering three main aspects in sequence: the structure and construction of graphs, the design of related algorithms, and the exploration of computational models. In terms of computational models, a parallel DNA computing model was introduced. Based on this model, the team successfully conducted experiments to solve a graph coloring problem with 61 vertices, achieving a search scale of 3^59, which represents the largest biological experiment of its kind internationally to date. Inspired by the DNA computing model and its hardware implementation, we proposed a 9-tuple computational model for underlying parallel computing, termed the Probe Machine. Its data is multidimensional, and the concept of "probe" is analogous to that in biotechnology, serving as a "binder" to locate specific data and establish connections among them. Subsequently, two types of probe computer models based on biological and electronic technologies were introduced. Among them, the Blocking Non-Solution Probe Computing System was successfully applied to solve a graph coloring problem with 114 vertices, demonstrating the potential of biological computing in tackling complex problems. The electronic probe computer based on FPGA cards exhibits high parallelism, scalability, and universal solving capabilities for NP-complete problems, offering a novel approach to efficient computing.

INVITED LECTURES

Liangming Chen

Southern University of Science and Technology

Multi-robot Cooperative Localization and Swarm Formations based on Angle Rigidity Theory

17:00–17:50, May 18, 2025, Beijing Room

Liangming Chen joined the Southern University of Science and Technology in December 2022 as an associate professor. Before joining SUSTech, he worked as a postdoctoral researcher in the research group of Professor Xie Lihua (Fellow of the Singapore Academy of Engineering, Fellow of the IEEE) at Nanyang Technological University, Singapore. He and his collaborators developed the theory of angle rigidity theory and applied it to multi-agent formation control and distributed localization. As the first author, he published multiple research results in top journals in the field of control and robotics, including IEEE TAC, Automatica, IEEE TRO, TCST, TSP, etc. He is an editorial board member of the European Control Association and IET-The Journal of Engineering, a senior member of IEEE, and has been selected for the National High-level Talent Program Youth Project and Shenzhen Overseas High-level Talent Program.

Abstract: In recent years, there has been an increasing demand for unmanned system (or intelligent system) swarm formations in the fields of sea, land, air, and space, which have important application value in tasks such as ocean monitoring, ground exploration, aerial operations, and deep space exploration. However, in many environments (such as buildings, tunnels, forests, underwater, and denied environments), the global positioning system (GPS) is unreliable or non-existent, which requires techniques on how to perform collaborative localization and formation control based on local measurement information between unmanned systems. This talk will introduce the collaborative localization and formation control of unmanned systems in GPS-denied, communication-degraded, or denied environments, as well as a mathematical tool developed to solve these engineering problems: angle rigidity theory.

Biao Luo

Central South University

Principles and Recent Advances of Off-policy Reinforcement Learning for Optimization Control

16:00–16:30, May 18, 2025, Beijing Room

Biao Luo, IEEE Senior Member, received the Ph.D. degree in control science and engineering from Beihang University, Beijing, China, in 2014. He is currently a Professor with the School of Automation, Central South University (CSU), Changsha, China. Before joining CSU, he was an Associate Professor and Assistant Professor with the Institute of Automation, Chinese Academy of Sciences, Beijing, China, from 2014 to 2018. He published 100+ papers, including top journals and conferences IEEE TPAMI, Automatica, AAAI, etc. He serves as an Associate Editor for the IEEE Transactions on Neural Networks and Learning Systems, the Artificial Intelligence Review, and the Neurocomputing. He is a Senior Member of the IEEE, and the Vice-Chair of Adaptive Dynamic Programming and Reinforcement Learning Technical Committee, Chinese Association of Automation. His current research interests include intelligent control, reinforcement learning, deep learning, and decision-making.

Abstract: Off-policy reinforcement learning is able to learn the optimization control with system data generated by other behavior control policies. It overcomes the problems of inadequate exploration, inefficient data utilization, data collecting difficulty, etc., which makes off-policy learning control more practical and easy to realize. In this report, the principles and recent advantages about off-policy learning based on control methods are discussed based the number of controller/player involved, i.e., single-/two-/multi-player.

Yisheng Lv

Chinese Academy of Sciences

Decentralized Autonomous Operation for Parallel Traffic Management and Control

17:00–17:50, May 18, 2025, Macau Room

Yisheng Lv is currently a Professor with the Institute of Automation, Chinese Academy of Sciences, Beijing, China. He is also with the University of Chinese Academy of Sciences, Beijing. His research interests include artificial intelligence for transportation, intelligent vehicles, and parallel traffic management and control systems. He received the 2023 IEEE Intelligent Transportation Systems Research Award and many best paper awards. He is now the Editor-in-Chief of IEEE Intelligent Transportation Systems Magazine.

Abstract: We will talk about our recent work on decentralized autonomous operation (DAO) for parallel traffic management and control. We have built the open-source-driven parallel agentic intelligent traffic control platform, which supports modular integration, shares heterogeneous data and algorithms, and promotes the flexible deployment and collaborative evolution of the traffic control platform. Incorporating the DAO-driven collaborative governance mechanism, it promotes the joint participation of scientific research institutions, government departments, and the public, and improves the transparency of governance, the democracy of decision-making, and the efficiency of governance of traffic control. Through the closed-loop operation mode of "open-source platform - open co-governance - demonstration verification", we hope a sustainable iterative and evolving intelligent traffic control ecosystem will be constructed.

Ning Sun

Nankai University

Intelligent Perception and Control for Underactuated Cranes With Applications

17:30–18:00, May 18, 2025, Macau Room

Ning Sun is a Young Scholar of the Changjiang Scholars Program and a professor with Nankai University, Tianjin, China, and the Shenzhen Research Institute of Nankai University, Shenzhen, China. He received the B.S. degree in measurement & control technology and instruments from Wuhan University, Wuhan, China, in 2009, and the Ph.D. degree in control theory and control engineering from Nankai University, Tianjin, China, in 2014; he was a Japan Society for the Promotion of Science (JSPS) Fellow from 2018 to 2019. His research interests include intelligent control for mechatronic/robotic systems with an emphasis on (industrial) applications. Dr. Sun received the 2021 IEEE Transactions on Industrial Electronics Outstanding Paper Award, the Machines 2021 Young Investigator Award, the 2019 Wu Wenjun Artificial Intelligence Excellent Youth Award, the ICCAR 2022 Young Scientist Award, the 2024 IEEE Transactions on Systems, Man, and Cybernetics: Systems Outstanding Associate Editor Award, the 2023 International Journal of Control, Automation, and Systems Best Associate Editor, and several outstanding journal/conference paper awards. He serves as an Associate Editor for several journals, including the IEEE Transactions on Industrial Electronics, IEEE Transactions on Systems, Man, and Cybernetics: Systems, IEEE Transactions on Intelligent Transportation Systems, IEEE/ASME Transactions on Mechatronics, and IEEE Systems Journal. He is a Senior Member of the IEEE.

Abstract: As heavy industrial engineering machines, cranes have been playing very important roles in various fields, such as logistics, construction, metallurgy, and manufacturing, among others. The major task for cranes is to transport cargos from their initial positions to desired locations rapidly and accurately, with negligible swing. At present, most cranes used in practice are operated by human operators, which exhibits such drawbacks as low efficiency, poor anti-swing performance, incorrect operations, and high risks. Therefore, the problem of anti-swing positioning control for cranes important both theoretically and practically. Cranes are typically underactuated systems, i.e., they have fewer control inputs than their degrees of freedom (DoFs), making their control problem challenging. In this presentation, I will first share some of our recent results on dynamics analysis, motion planning, and intelligent control of different crane systems, including overhead cranes, rotary cranes, tower cranes, ship-mounted cranes, etc., with hardware experiments and applications. Then, some of our extended and related researches on robotic systems with similar dynamic characteristics will also be discussed briefly, including self-balance robots, pneumatic artificial muscle (PAM)-actuated robots, metal ingot polishing-oriented industrial robots, and so on.

Zhuo Wang

Beihang University

Stability and Stabilizability of Interval Systems and Their Applications

16:30–17:00, May 18, 2025, Macau Room

Zhuo Wang is a Professor and Doctoral Supervisor at Beihang University. He graduated with Ph.D. degree from the University of Illinois Chicago in 2013, worked as a postdoctoral researcher in the Department of Electronic and Computer Engineering at the University of Alberta in Canada from 2013 to 2014. From 2014 to 2015, he served as a Research Assistant Professor and a Postdoctoral Researcher at the Fok Ying Tung Research Institute of the Hong Kong University of Science and Technology. He won the National Youth Talent Project in 2015. He is currently serving as the Head of the Department of Intelligent Perception Engineering at the School of Instrumentation Science and Opto-electronics Engineering, Beihang University. Prof. Wang's research directions include: data-driven system analysis and control, atomic spin system analysis and control, nonlinear system analysis and control, adaptive dynamic programming methods, and performance analysis of time-delay systems, etc. Prof. Wang won the Second Prize of the Natural Science Award of the Chinese Association of Automation in 2024; the Second Prize of Shandong Provincial Natural Science Award in 2024. He received the "Young Scientist Award" from the Chinese Association of Automation in 2021, and won the Excellent Achievement Award for Scientific Research in Higher Education Institutions (Science and Technology) by the Ministry of Education in Natural Science, in 2019. Prof. Wang is currently the Vice Chair of the Youth Working Committee of the Chinese Association of Automation. He is a Member of the Data Driven Control, Learning and Optimization Technical Committee of the Chinese Association of Automation, a Member of Quantum Computing Systems and Control Technical Committee of The IEEE Control Systems Society, and a Member of Autonomous Unmanned System Technical Committee of the Chinese Association for Artificial Intelligence. Prof. Wang is an Associate Editor of IEEE Transactions on Systems, Man, and Cybernetics: Systems, an Editorial Board Member of Acta Automatica Sinica, an Editorial Board Member of Control Theory & Applications; and an Editorial Board Member of Pattern Recognition and Artificial Intelligence.

Abstract: In actual operating control systems, there are more or less uncertain factors, such as measurement errors of precision instruments, cumulative errors of machining processes, external disturbances, etc., making it difficult to establish an accurate mathematical model of the system object. Treating constant parameters as variables that vary within corresponding intervals, can more accurately describe the actual control process and reflect the system perturbations and external disturbances. This report investigates whether a system with a known nominal model and disturbance intensity can maintain stability under perturbations, and how to design a controller to ensure stable operation of the system. This report first proposes a method for determining the stability and controllability of linear time invariant (LTI) interval systems, as well as a design method for state feedback stabilization controllers. The stability conditions given are less conservative than the methods of Harritonov's theorem and Gershgolin's disk theorem. Specifically, the stability determination and feedback stabilization control methods for some LTI interval systems are necessary

and sufficient conditions. Compared with the stability analysis and feedback stabilization design methods of traditional LTI interval systems, the computational complexity of the developed decision method is greatly reduced, thanks to the proposed special form of parameter vertex matrix. In addition, as linear system analysis simplifies the original system model, nonlinear interval models are closer to the original model. Therefore, based on the Lyapunov method, this report further proposes a method for determining the stability and controllability of nonlinear interval systems, and provides an effective approach for the design of state feedback stabilization controllers. Finally, the stability analysis method presented is applied to the temperature control system of a spin-exchange relaxation-free atomic magnetometer (SERFAM), which is a high-precision magnetic field measurement device, whose performance is significantly affected by the temperature of the alkali metal chamber. Combining the stability analysis method of interval systems with Active Disturbance Rejection Control (ADRC) can significantly reduce the range of parameter tuning in practical applications, can improve debugging efficiency, and can ensure the stability of the controller and accurate estimation of the observer, enabling the SERFAM to operate stably in complex environments for a long time.

Dengxiu Yu

Northwestern Polytechnical University

Proactive Situation Prediction of Clustered Targets under Incomplete Information: Key Techniques and Applications

17:30–18:00, May 18, 2025, Beijing Room

Dengxiu Yu is a Professor at the Institute of Optoelectronics and Intelligence, Northwestern Polytechnical University. He has dedicated his career to research in game theory and its applications, achieving a series of innovative results in group games, intelligent decision-making, and cooperative control under complex adversarial scenarios. He has led three National Natural Science Foundation projects, one ZF project, four JKW projects, three provincial-level projects, and six national defense projects for military research institutes. Professor Yu has published over 60 high-level academic papers in renowned international journals such as IEEE TNNLS, TIE, TASE, TII, and TCYB, and holds more than 30 national invention patents. His work has earned high praise from leading scholars including academicians of the Chinese Academy of Sciences, European academicians, and IEEE/ACM Fellows. He currently serves as the Deputy Secretary-General of the Xi'an Youth Science and Technology Association, as an Associate Editor of IEEE SMC Magazine, and as an editorial board member for four journals, including CMC and MBE. His accolades include the Wu Wenjun Outstanding Young Award in Artificial Intelligence, the Second Prize of the Shaanxi Provincial Science and Technology Progress Award, the Second Prize of the China Command and Control Society Science and Technology Progress Award, as well as recognitions from the Shaanxi Provincial High-level Talent Introduction Program and the Youth Talent Support Program of Shaanxi Universities' Association of Science and Technology. Additionally, he has served as a session chair at conferences such as SPAC and CFAI and has been invited to present academic reports at more than ten renowned domestic and international conferences.

Abstract: In the context of intelligent air defense and anti-missile systems, swarm targets serve as the core entities in offensive and defensive operations. Accurate situational prediction of these targets provides scientific support for "autonomous interception, resilient defense, and intelligent decision-making," directly determining the effectiveness of system confrontation and battlefield dominance. This report addresses the problem of situational deduction and prediction for swarm targets in complex battlefield environments. Starting from the application of data models, it proposes key technologies for active situational prediction of swarm targets under incomplete information. Specifically, it introduces critical technologies and their applications, including interpretable trajectory prediction of swarm targets under prior complexity, global behavior recognition of swarm targets amid behavioral diversity, and credible intent inference of swarm targets under information asymmetry.

Meng Zhang

Xi'an Jiaotong University

Reinforcement Learning Driven Power System Frequency Control

16:00–16:30, May 18, 2025, Macau Room

Meng Zhang is a Professor and Young Changjiang Scholar of Xi'an Jiaotong University. He graduated from the School of Control Science and Engineering of Zhejiang University, and has won the first prize of Shaanxi University Science and Technology Research Outstanding Achievement Award, the first prize of Natural Science Award of Chinese Association of Automation, Wu Wenjun Artificial Intelligence Outstanding Youth Award, Huawei-Shengsi Chinese Association of Artificial Intelligence Academic Fund Excellence Project Award, etc. He has published over 70 papers in journals such as Automation, IEEE TAC, and IEEE TIFS, and led over 20 projects, including National Natural Science Foundation of China key projects, National Defense Science and Technology Innovation Special Zone projects, and enterprise projects. He serves as an Associate Editor for IEEE Transactions on Automation Science and Engineering, IEEE Transactions on Cybernetics, IEEE/SME Transactions on Mechatronics Focused Section. His research interests include optimal control of power systems, nonlinear system control, mobile robots, etc.

Abstract: Due to the increasing complexity of power systems, purely model-based control methods are difficult to effectively solve frequency control problems in complex power systems. Therefore, reinforcement learning, as one of the promising data-driven methods, has been widely studied and used to solve this problem. This talk first introduces how to use Lyapunov theory and stable deep dynamic models to ensure the stability of the system equilibrium, and optimize the model through deep reinforcement learning architecture to improve the control performance of grid connected and grid following inverters. Then, design a multi-agent deep reinforcement learning framework that combines offline training and online learning, propose a model free frequency control method for power systems, and implement adaptive multi-area power system collaborative control to cope with system uncertainties caused by renewable energy and other factors. Finally, the experimental results demonstrate that the reinforcement learning driven control method can achieve better control performance than traditional methods under various grid conditions and disturbances.

Xueyan Zhao

South China University of Technology

Necessary and Sufficient Conditions for the Asymptotic Stability of Stochastic Systems With Discrete-Time Feedbacks and Applications

16:30–17:00, May 18, 2025, Beijing Room

Xueyan Zhao is a professor with School of Automation Science and Engineering, South China University of Technology, and a recipient of the National Excellent Youth Fund. She received the Ph.D degree in Systems Engineering from SCUT in June 2014, and visited the University of Newcastle, Australia from Aug. 2018 to Aug. 2019. Now she is serving as a member of the Technical Committee on Control Theory (TCCT) and the Committee of Female Science and Technology Workers, Chinese Association of Automation (CAA), the vice chair of the IEEE CSS Guangzhou Chapter, and a youth editor of the IEEE/CAA Journal of Automatica Sinica, etc. In recent years, she has published over 60 papers in IEEE Transactions on Automatic Control, Automatica and other journals. She has hosted more than 10 scientific research projects, including the NSFC funds and NSFGP funds. Her research interests include the modeling, stability and stabilization of the stochastic systems with applications.

Abstract: The talk is concerned with some essential features of stochastic control systems with sampled data (SCSwSDs). First, it is shown by two propositions that the moment asymptotic stability of the underlying system is equivalent to that of any regular accurate numerical scheme under simple conditions, which is convenient to be structured specially for SCSwSDs. This kind of principle provides a way for inferring moment asymptotic stability of SCSwSDs by numerical simulations logically. The accurate scheme construction procedure is introduced in a general framework and illustrated for the quasi linear models, and the mean square asymptotic stability of linear SCSwSDs is investigated as the first application of the propositions. It is found that stochastic systems may be stabilized in appointed time by sampled data based control (SDBC). The restriction to the upper bound of the sampling period is confirmed as well. The almost sure stability of a kind of controlled system with sampled noise is analyzed via the discrete scheme approach as the second application of the propositions. The concepts of accurate numerical computation and simulation (ANCS) are proposed. A distinctive characteristic, SDBC-only in short, is reported and studied preliminarily based on ANCS and the equivalence propositions. Some important remarks are given as further analyses on some related issues.

Technical Program

Saturday, May 17, 2025

SaA01 13:30–15:30 三楼北京厅
Special Session: Modeling and Intelligent Control of Complex Systems (1)

Organizer: Xing, Shuangyun — Shenyang Jianzhu Univ.
Organizer: Zhao, Xueyan — South China Univ. of Tech.
Organizer: Deng, Feiqi — South China Univ. of Tech.
Chair: Deng, Feiqi — South China Univ. of Tech.
Co-Chair: Xing, Shuangyun — Shenyang Jianzhu Univ.
Co-Chair: Zhao, Xueyan — South China Univ. of Tech.

▶ SaA01-1 13:30–13:50
Wind Turbine Blades Defect Detection Based on Attention and Dynamic Upsampling
Dai, Weikun — Guangdong Polytechnic Normal Univ.
Dong, Xiangjun — Guangdong Polytechnic Normal Univ.
Xiong, Jianbin — Guangdong Univ. of Tech.
Ying, Ze Kai — Guangdong Polytechnic Normal Univ.
Shi, Jinjia — Guangdong Polytechnic Normal Univ.

▶ SaA01-2 13:50–14:10
Blood Glucose Prediction Algorithm via TimesNet-MPINN
Zhang, Huafeng — Univ. of Sci. & Tech. Beijing
Wang, Mian — Univ. of Sci. & Tech. Beijing
Song, Ruizhuo — Univ. of Sci. & Tech. Beijing

▶ SaA01-3 14:10–14:30
Adaptive Quantized Control for Nonlinear Stochastic Systems Based on IT2FNN
Xing, Shuangyun — Shenyang Jianzhu Univ.
Wei, Mingchen — Shenyang Jianzhu Univ.

▶ SaA01-4 14:30–14:50
Model-based and Model-free Algorithms for Stochastic H_∞ Tracking Control
Wang, Li — South China Univ. of Tech.
Deng, Feiqi — South China Univ. of Tech.
Zhao, Xueyan — South China Univ. of Tech.

▶ SaA01-5 14:50–15:10
Asynchronous Quantization Control of Stochastic Markov Jump Systems with Round-Robin Protocol
Dong, Jingjing — South China Univ. of Tech.
Deng, Feiqi — South China Univ. of Tech.
Zhao, Xueyan — South China Univ. of Tech.

▶ SaA01-6 15:10–15:30
Stabilization of Stochastic Complex Networks Driven by G-Brownian Motion under Exponential-type Dynamic Event-Triggered Control
Ma, Junqing — South-Central Minzu Univ.
Hu, Junhao — South-Central Minzu Univ.
Li, Sen — South-Central Minzu Univ.

SaA02 13:30–15:30 三楼香港厅I
Special Session: Intelligent Marine Vehicle Control Techniques

Organizer: Bai, Weiwei — Dalian Maritime Univ.
Organizer: Xue, Shan — Hainan Univ.
Chair: Bai, Weiwei — Dalian Maritime Univ.
Co-Chair: Xue, Shan — Hainan Univ.

▶ SaA02-1 13:30–13:50
Optimal Route Selection for Berthing and Unberthing Based on AIS Data
Shi, Zhiqiang — Dalian Maritime Univ.
Xie, Haibo — Dalian Maritime Univ.
Qiao, Guanzhou — Dalian Maritime Univ.

▶ SaA02-2 13:50–14:10
Data-Driven Trajectory Tracking Control of Underactuated Marine Surface Vessel via Adaptive Dynamic Programming
Lei, Jiahu — Dalian Maritime Univ.
Bai, Weiwei — Dalian Maritime Univ.
Zhang, Wenjun — Dalian Maritime Univ.

▶ SaA02-3 14:10–14:30
Optimal Trajectory Tracking of Unmanned Surface Vessels with Input Constraints via Adaptive Dynamic Programming
Ding, Meihua — Hainan Univ.
Xue, Shan — Hainan Univ.

▶ SaA02-4 14:30–14:50
Multi-USV Adaptive Fixed-Time Robust Formation Tracking Control
Liu, Wenzhi — Jimei Univ.
Li, Zifu — Jimei Univ.
Lei, Kai — Jimei Univ.
Zheng, Hongqing — Jimei Univ.

▶ SaA02-5 14:50–15:10
Robust Predictive Asynchronous Switching Control for Multi-phase Batch Processes with Small Time Delays
Xiang, Wei — Liaoning Petrochemical Univ.
Ren, Haonan — Liaoning Petrochemical Univ.
Shi, Huiyuan — Liaoning Petrochemical Univ.
Qiu, Xiaolu — Liaoning Petrochemical Univ.

▶ SaA02-6 15:10–15:30
Reinforcement Learning Control with Motion Constraints for Autonomous UAV Landing on Moving USV
Huang, Ziheng — Hainan Univ.
Xue, Shan — Hainan Univ.

SaA03 13:30–15:30 三楼香港厅II
Regular Session: Adaptive Dynamic Programming and Reinforcement Learning (1)

Chair: Liang, Yuling — Shenyang Univ. of Tech.
Co-Chair: Xu, Yancai — Chinese Acad. of Sci.

▶ SaA03-1 13:30–13:50
ADP-based Control Design for Nonlinear Systems with Multi-inputs without Using Initial Admissible Control Laws
Yuan, Hao — Shenyang Univ. of Tech.
Liang, Yuling — Shenyang Univ. of Tech.
Li, Dan — Shenyang Univ. of Tech.
Zhang, Xuanrui — Shenyang Univ. of Tech.
Chen, Junyan — Hangzhou Dianzi Univ.

▶ SaA03-2 13:50–14:10
Adaptive Cooperative Control for Nonlinear Multi-agent Systems Using NN-based Actor-Critic Structure
Liu, Lin — Central South Univ.
Luo, Biao — Central South Univ.

▶ SaA03-3 14:10–14:30
Dynamic Event-triggered Fault-tolerant Control for Nonlinear Systems by Using Adaptive Dynamic Programming
Liang, Yuling — Shenyang Univ. of Tech.
Liu, Si Zhao — Shenyang Univ. of Tech.
Shao, Zhi — Shenyang Univ. of Tech.
Wang, Hong — Shenyang Univ. of Tech.

▶ SaA03-4 14:30–14:50
ADP-based Finite-horizon Control for Discrete-time Systems with Multi-inputs and Actuator Saturations
Li, Jiaqi — Shenyang Univ. of Tech.
Li, Yuan — Shenyang Univ. of Tech.
Liang, Yuling — Shenyang Univ. of Tech.
Ma, Junguan — Shenyang Univ. of Tech.
Chen, Junyan — Hangzhou Dianzi Univ.

▶ SaA03-5 14:50–15:10
Online Fine-Tuning Policy With Offline Pretraining via Adaptive Dynamic Programming
Wang, Jiangyu — Beijing Univ. of Tech.
Wang, Ding — Beijing Univ. of Tech.
Qiao, Junfei — Beijing Univ. of Tech.

▶ SaA03-6 15:10–15:30
UAV Obstacle Avoidance Algorithm Based on DDPG-PID
Gao, Xinyue — Liaoning Petrochemical Univ.
Bai, Zixuan — Liaoning Petrochemical Univ.

SaA04 13:30–15:30 三楼澳门厅I
Regular Session: Robotics, Navigation and Control
Chair: Tan, Fuxiao — Shanghai Maritime Univ.
Co-Chair: Ren, Junkai — National Univ. of Defense Tech.

▶ SaA04-1 13:30–13:50
Identical Parallel Batch Processing Machine Scheduling Problem with Time-of-Use Electricity Tariffs
Aliyu, Seid — Central South Univ.
Zhou, Shengchao — Central South Univ.

▶ SaA04-2 13:50–14:10
Enhanced YOLOv11 Architecture for Accurate Acupoint Localization
Cao, Yingying — Guangdong Univ. of Tech.
He, Zhaoshui — Guangdong Univ. of Tech.
Lin, Zhijie — Guangdong Univ. of Tech.
Hao, Liang — Guangdong Univ. of Tech.
Guo, Jing — Guangdong Univ. of Tech.

▶ SaA04-3 14:10–14:30
Reconfigurable Microrobots: Recent Progress and Future Challenges
Cai, Xihang — South China Univ. of Tech.
Salehi, Amar — South China Univ. of Tech.
Yu, Tingting — South China Univ. of Tech.

▶ SaA04-4 14:30–14:50
Underwater Visual Docking Systems for AUVs: A Comprehensive Review
Zhu, Wei — Univ. of Chinese Acad. of Sci.
Sun, Kai — Shenyang Inst. of Automation
Li, Yiyang — Chinese Acad. of Sci.

▶ SaA04-5 14:50–15:10
Hierarchical Task Scheduling and Robotic Manipulation for Autonomous Materials Discovery
Lu, Jiang — National Univ. of Defense Tech.
Ren, Junkai — National Univ. of Defense Tech.
Qu, Yuke — National Univ. of Defense Tech.
Luo, Jiawei — National Univ. of Defense Tech.
Lu, Huimin — National Univ. of Defense Tech.
Zheng, Zhiqiang — National Univ. of Defense Tech.
Ye, Yicong — National Univ. of Defense Tech.

▶ SaA04-6 15:10–15:30
Comprehensive Overview of Transmedia Vehicles and Review of Trans-Domain Attitude Control Technologies
Tan, Fuxiao — Shanghai Maritime Univ.
Xu, Hengyang — Shanghai Maritime Univ.

SaA05 13:30–15:30 三楼澳门厅II
Regular Session: Data-based Learning, Control and Optimization
Chair: Qi, Yiwen — Fuzhou Univ.
Co-Chair: Liu, Dong — Shenyang Aerospace Univ.

▶ SaA05-1 13:30–13:50
Model Free Adaptive Fault-tolerant Control for Discrete-time Systems under DoS Attacks
Wang, Weijun — Shenyang Aerospace Univ.
Liu, Dong — Shenyang Aerospace Univ.

▶ SaA05-2 13:50–14:10
Adaptive Hysteresis Model Parameter Identification with Kalman Filtering
Ye, Haopeng — Jinan Univ.
Zhang, Yangming — Jinan Univ.
Guo, Siyuan — Jinan Univ.

▶ SaA05-3 14:10–14:30
Design of Fuzzy Radial Basis Function Neural Networks with 1D Convolutional Neural Network for Classification of Logistics Black Plastics
Yu, Hongliang — Linyi Univ.
Zhou, Kun — Linyi Univ.
Guo, Ming — Linyi Univ.
Zhao, Feng — Linyi Univ.
Chen, Xiangyong — Linyi Univ.
Qiu, Jianlong — Linyi Univ.

▶ SaA05-4 14:30–14:50
Standard Power Function, Absolute-Value Power Function, and Zhang Power Function
Zhang, Yunong — Sun Yat-sen Univ.
Shao, Pengyuan — Sun Yat-sen Univ.
Chen, Jielong — Sun Yat-sen Univ.

▶ SaA05-5 14:50–15:10
Variational Bayesian Methods in Smart Grid: A Comprehensive Review of Multi-Application Innovations
Chen, Yanwei — Shanghai Maritime Univ.
Tan, Fuxiao — Shanghai Maritime Univ.

▶ SaA05-6 15:10–15:30
Aeroengine RUL Prediction and Energy Management: A CPSO-ELM-Based Algorithm
Peng, Jin — AECC Sichuan Gas Turbine Establishment
Liu, Zhitao — Fuzhou Univ.
Li, Xin — AECC Sichuan Gas Turbine Establishment
Li, Ran — AECC Sichuan Gas Turbine Establishment
Jiang, Jiahui — Qingdao Univ.
Qi, Yiwen — Fuzhou Univ.

SaB01 16:00–18:00 三楼北京厅
Special Session: Adaptive Intelligent Control for Complex Control Systems
Organizer: Li, Jinna — Liaoning Petrochemical Univ.
Organizer: Wang, Ding — Beijing Univ. of Tech.
Organizer: Shi, Huiyuan — Liaoning Petrochemical Univ.
Chair: Li, Jinna — Liaoning Petrochemical Univ.
Co-Chair: Wang, Ding — Beijing Univ. of Tech.
Co-Chair: Shi, Huiyuan — Liaoning Petrochemical Univ.

▶ SaB01-1 16:00–16:20
Robust Model Predictive Control with Multi-Step Compensation for Ethylene Cracking Outlet Temperature Tracking
Wang, Weizhen — Liaoning Petrochemical Univ.
Li, Aolong — Liaoning Petrochemical Univ.
Qiu, Xiaolu — Liaoning Petrochemical Univ.
Shi, Huiyuan — Liaoning Petrochemical Univ.

▶ SaB01-2 16:20–16:40
Robust Fuzzy Predictive Control Based on Lyapunov-Razumikhin with Nonlinear Asynchronous Switching for Multiphase Batch
Li, Aolong — Liaoning Petrochemical Univ.
Wang, Weizhen — Liaoning Petrochemical Univ.
Qiu, Xiaolu — Liaoning Petrochemical Univ.
Shi, Huiyuan — Liaoning Petrochemical Univ.

▶ SaB01-3 16:40–17:00
Improved YOLOv8n-Based Flame and Smoke Detection Model
Zhang, Yu — Liaoning Petrochemical Univ.
Xiao, Xia1 — Liaoning Petrochemical Univ.
Wang, Weiling — Liaoning Petrochemical Univ.
Wang, Yue — Liaoning Petrochemical Univ.

▶ SaB01-4 17:00–17:20
Security Inspection System Based on Improved Swin-Transformer
Xiao, Xia1 — Liaoning Petrochemical Univ.
Zhang, Yu — Liaoning Petrochemical Univ.
Wang, Weiling — Liaoning Petrochemical Univ.
Wang, Yue — Liaoning Petrochemical Univ.

▶ SaB01-5 17:20–17:40
Two-Dimensional Path Tracking Control of Bridge Crane Based on DDPG and Adaptive LOS
Zhao, Xiyuan — Liaoning Petrochemical Univ.
Wang, Bingxue — Liaoning Petrochemical Univ.
Wang, Pengfei — Liaoning Petrochemical Univ.
Jin, Xin — Liaoning Petrochemical Univ.

▶ SaB01-6 17:40–18:00
UAV Autonomous Navigation Strategy Based on Deep Reinforcement Learning
Feng, Jiayu — Liaoning Petrochemical Univ.
Bai, Zixuan — Liaoning Petrochemical Univ.

SaB02 16:00–18:00 三楼香港厅I
Special Session: Intelligent Fault-tolerant Control and Optimization for Complex Systems
Organizer: Teng, Fei — Dalian Maritime Univ.
Organizer: Sun, Jian — Northeastern Univ.
Organizer: Li, Tieshan — Univ. of Electronic Sci. & Tech. of China
Chair: Teng, Fei — Dalian Maritime Univ.
Co-Chair: Sun, Jian — Northeastern Univ.
Co-Chair: Li, Tieshan — Univ. of Electronic Sci. & Tech. of China

▶ SaB02-1 16:00–16:20
Evaluation of the Chinese Syntactic Ability for Modern BERT
Yu, Han — China Univ. of Petroleum (Beijing)

Sun, Haipeng — Minzu Univ. of China
Sun, Jian — Northeastern Univ.
Shan, Qihe — Dalian Maritime Univ.

▶ SaB02-2 16:20–16:40
A Novel Switching Control Approach to Multiple Systems and Its Application in Aero-engines
Li, Ruoqi — Dalian Minzu Univ.
Sun, Jian — Northeastern Univ.
Shan, Qihe — Dalian Maritime Univ.
Zhang, Jianxing — Dalian Minzu Univ.
Wu, Qingmei — Dalian Minzu Univ.

▶ SaB02-3 16:40–17:00
Event-Based Prescribed-Time Output Regulation of Uncertain Nonlinear Multiagent Systems
Yan, Yancheng — Univ. of Electronic Sci. & Tech. of China
Li, Tieshan — Univ. of Electronic Sci. & Tech. of China
Long, Yue — Univ. of Electronic Sci. & Tech. of China

▶ SaB02-4 17:00–17:20
Intelligent Singularity-Free Finite-Time Tracking Control for An Autonomous Surface Vessel
Su, Yuanbo — Dalian Maritime Univ.
Shan, Qihe — Dalian Maritime Univ.
Teng, Fei — Dalian Maritime Univ.
Yu, Renhai — Dalian Maritime Univ.

▶ SaB02-5 17:20–17:40
Asynchronous Thruster Fault Detection for Unmanned Marine Vehicles under Multiple Attacks
Wang, Fuxing — Univ. of Electronic Sci. & Tech. of China
Long, Yue — Univ. of Electronic Sci. & Tech. of China
Li, Tieshan — Univ. of Electronic Sci. & Tech. of China

▶ SaB02-6 17:40–18:00
Design of A Nonlinear Model Predictive Controller Based on Echo State Network (ESN)
Wang, Shuo — Liaoning Petrochemical Univ.
Zhao, Xiyuan — Liaoning Petrochemical Univ.
Li, Ziqian — Liaoning Petrochemical Univ.
Jin, Xin — Liaoning Petrochemical Univ.

SaB03 16:00–18:00 三楼香港厅II
Regular Session: Adaptive Dynamic Programming and Reinforcement Learning (2)
Chair: Peng, Zhinan — Univ. of Electronic Sci. & Tech. of China
Co-Chair: Lin, Mingduo — Southern Univ. of Sci. & Tech.

▶ SaB03-1 16:00–16:20
Adaptive Optimal Tracking Control for Large-Scale Multi-Agent Systems with Input Constraints: A Federated Learning Approach
Yuan, Guoling — Beijing Normal Univ.
Lin, Mingduo — Southern Univ. of Sci. & Tech.
Zhao, Bo — Beijing Normal Univ.

▶ SaB03-2 16:20–16:40
Solving Two-Team Zero-Sum Markov Game with Transformers and Value Decomposition Methods
Chen, Wenzhang — Chinese Acad. of Sci.
Zhu, Yuanheng — Chinese Acad. of Sci.

▶ SaB03-3 16:40–17:00
Event Triggered Optimal Control of Unknown Robot Systems with Online Parameter Estimation
Yin, Peiyu — Chengdu Univ. of Information Tech.
Du, Yuanhua — Univ. of Electronic Sci. & Tech. of China
Luo, Rui — Chengdu Univ.
Peng, Zhinan — Univ. of Electronic Sci. & Tech. of China
Chen, Chen — Univ. of Electronic Sci. & Tech. of China
Nan, Zhou — Univ. of Electronic Sci. & Tech. of China

▶ SaB03-4 17:00–17:20
Gaussian Q-learning for LQT of Unkown Systems with Random Disturbances
Li, Xincheng — Liaoning Petrochemical Univ.
Bai, Zixuan — Liaoning Petrochemical Univ.
Gang, Yiqing — Liaoning Petrochemical Univ.

▶ SaB03-5 17:20–17:40
Reinforcement Learning-Based Fixed-Time Tracking Control for Nonlinear System with Disturbances
Mao, Xiao — Shenyang Univ. of Tech.
Liang, Yuling — Shenyang Univ. of Tech.
Zhang, Juan — Northeastern Univ.
Chen, Junyan — Hangzhou Dianzi Tech.

▶ SaB03-6 17:40–18:00
Advances in Underwater Doppler Noise Suppression: From Signal Processing to Deep Learning
Li, Cheng — Shanghai Maritime Univ.

SaB04 16:00–18:00 三楼澳门厅I
Regular Session: Autonomous Systems and Control
Chair: Zhang, Dehua — Henan Univ.
Co-Chair: Hu, Xin — Ludong Univ.

▶ SaB04-1 16:00–16:20
Acceleration-Level Obstacle Avoidance Scheme Based on Quadratic Programming for Redundant Robot Arms
Qu, Li — Hainan Univ.
Cang, Naimeng — Hainan Univ.
Guo, Dongsheng — Hainan Univ.
Yu, Yilin — Hainan Univ.

▶ SaB04-2 16:20–16:40
Model Predictive Control for Trajectory Tracking of Unmanned Surface Vessel Based on Support Vector Regression
Jiang, Lichao — Harbin Engineering Univ.
Fang, Hai — Shanghai Electro-Mechanical Engineering Inst.
Shang, Xiaobing — Harbin Engineering Univ.
Zhang, Zhi — Harbin Engineering Univ.

▶ SaB04-3 16:40–17:00
Intelligent Gold Ore Exploration System Integrating Laser-Induced Breakdown Spectroscopy and Genetic Algorithm-Optimized Neural Network
Wang, Lizhu — Henan Univ.
Li, Jinghang — Henan Univ.
Zhao, Zuncheng — Henan Univ.
Zhang, Dehua — Henan Univ.

▶ SaB04-4 17:00–17:20
Fuzzy Adaptive Control for Permanent Magnet Synchronous Motor Based on Extend State Observer and Event-triggered Mechanism
Wang, Yuenan — Changchun Univ. of Tech.
Zhang, Zhenglong — Changchun Univ. of Tech.
Shan, Huadi — Changchun Univ. of Tech.
Wang, Shenquan — Changchun Univ. of Tech.

▶ SaB04-5 17:20–17:40
Event-based Discrete-time H∞ Output Consensus for Heterogeneous Multi-agent Networks
Xin, Zhenghao — Nanjing Univ. of Sci. & Tech.
Zhang, Liangyin — Nanjing Univ. of Sci. & Tech.
Chen, Michael Z. Q. — Nanjing Univ. of Sci. & Tech.
Ye, Yanyan — Guangdong Univ. of Tech.
Wu, Zheng — Nanjing Police Univ.

▶ SaB04-6 17:40–18:00
Dynamic Event-triggered Anti-disturbance Stabilization for 3-DOF Shipborne Stabilization Platform with Actuator Saturated Dynamics
Xu, Dayu — China Classification Society
Zhang, Yifeng — Ludong Univ.
Liu, Yuxin — Ludong Univ.
Xin, Hu — Ludong Univ.

SaB05 16:00–18:00 三楼澳门厅II
Regular Session: Artificial Intelligence Algorithm and Applications
Chair: Gao, Chuang — Univ. of Sci. & Tech. Liaoning
Co-Chair: Liu, Shiqi — Chinese Acad. of Sci.

▶ SaB05-1 16:00–16:20
YOLO-DeepSORT Empowered UAV-based Traffic Behavior Analysis: A Novel Trajectory Extraction Tool for Traffic Moving Objects at Intersections
Ou, Jiajun — Guangdong Univ. of Tech.
Zeng, Weiliang — Guangdong Univ. of Tech.
Chen, Siyu — Guangdong Univ. of Tech.
Lu, Siyuan — Guangdong Univ. of Tech.

▶ SaB05-2 16:20–16:40
A Transfer Learning-Augmented Physics-Informed Neural Network with Spatiotemporal Adaptation for Efficient Wind Field Reconstruction
Zhao, Yuhang — Zhejiang Univ.
Jiang, Xuejun — Zhejiang Univ.
Zhang, Kai — Zhejiang Univ.

Pan, Yu — Zhejiang Univ.
Yang, Qinmin — Zhejiang Univ.

▶ SaB05-3 16:40–17:00
Distributed Reinforcement Learning for Intelligent Decision-Making
Bi, Kewei — Shanghai Maritime Univ.

▶ SaB05-4 17:00–17:20
Multi-Energy Load Forecasting via Two-Stage Decomposition and Informer-LSTM Hybrid Model
Wu, Zhengtao — Univ. of Sci. & Tech. Beijing
Song, Ruizhuo — Univ. of Sci. & Tech. Beijing
Zhao, Yufan — Univ. of Sci. & Tech. Beijing
Li, Chengfeng — Univ. of Sci. & Tech. Beijing
Guo, Shijie — Univ. of Sci. & Tech. Beijing

▶ SaB05-5 17:20–17:40
U²-KAN: Precise Medical Image Segmentation Model Combining Nested U-Structure and KAN
Qin, Qi — Univ. of Sci. & Tech. Liaoning
Li, Zhi Gang — Univ. of Sci. & Tech. Liaoning
Gao, Chuang — Univ. of Sci. & Tech. Liaoning
Jiang, Mengyi — Univ. of Sci. & Tech. Liaoning

▶ SaB05-6 17:40–18:00
RACUnet: A Registration Algorithm for Multi-Branch Abdominal Aortic Vessels Based on CTA and DSA Imaging
Zhang, Bo — Univ. of Sci. & Tech. Beijing
Liu, Shiqi — Chinese Acad. of Sci.
Xie, Xiaoliang — Chinese Acad. of Sci.
Zhou, Xiaohu — Chinese Acad. of Sci.
Hou, Zengguang — Chinese Acad. of Sci.
Song, Meng — Chinese Acad. of Sci.
Ma, Xiyao — Chinese Acad. of Sci.
Li, Shuo — Chinese Acad. of Sci.

SaB06 16:00–18:00 三楼贵宾室
Regular Session: Machine Learning-based Optimization, Control and Decision-making

Chair: Wang, Ziyang — Xilingol Vocational College
Co-Chair: Wang, Ke — Tianjin Univ.

▶ SaB06-1 16:00–16:20
Employing Machine Learning to Forecast the Factors Affecting the Mental Health of Young Outstanding Innovative Talents
Lv, Meixuan — Inst. of Psychology, Chinese Acad. of Sci.
Chen, Yaru — Inst. of Psychology, Chinese Acad. of Sci.
Gao, Cong — Inst. of Psychology, Chinese Acad. of Sci.
Zheng, Xigeng — Inst. of Psychology, Chinese Acad. of Sci.
Liu, Zhengkui — Inst. of Psychology, Chinese Acad. of Sci.

▶ SaB06-2 16:20–16:40
Error-Based Model-Free Active Disturbance Rejection Control for Non-affine Discrete-Time Nonlinear Systems
Cheng, Yun — Beijing Inst. of Tech.
Hu, Shuangyi — Zhejiang Univ. of Tech.
Chen, Qiang — Zhejiang Univ. of Tech.

▶ SaB06-3 16:40–17:00
Development and Validation of Machine Learning Based Model for Mortality Prediction in Patients with Burn Injuries：A Large-scale Multi-center Study
Liu, Yanjun — Tsinghua Univ.
Wang, Yangping — State Key Laboratory of Trauma, Burns & Combined Injury
Lv, Xuefeng — Logistics Support Department Information Center

▶ SaB06-4 17:00–17:20
Game-Theoretic Optimization of Active Orbital Defense via Multi-agent Reinforcement Learning
Wang, Ke — Tianjin Univ.
Liu, Shuo — Tianjin Univ.
Mu, Chaoxu — Tianjin Univ.
Lu, Ming — Beijing Inst. of Control Engineering

▶ SaB06-5 17:20–17:40
A Correlation-Based Fusion Algorithm for Collaborative Decision-Making Problems
Wang, Ziyang — Xilingol Vocational College
Yan, Tianyu — Xilingol Vocational College
Yan, Huiying — Mengdong New Energy Company
Wuniri, Qiqige — Xilingol Vocational College

▶ SaB06-6 17:40–18:00
Process Simulation and Effectiveness Evaluation for Launch and Recovery Operations of Carrier-Based Aircraft
Chen, Cheng — Marine Design & Research Inst. of China

Poster Session SaPoster
May 17, 13:30-18:00
三楼广深厅大堂

Chair: Guo, Dongsheng — Hainan Univ.
Co-Chair: Zhang, Xiumei — Changchun Univ. of Tech.

▷ SaPoster-01
Finite-Time Boundedness for Discrete Time-Varying Stochastic Linear Markov Jump Systems
Liu, Yezheng — Shandong Univ. of Sci. & Tech.
Li, Yan — Shandong Univ. of Sci. & Tech.
Liu, Xikui — Shandong Univ. of Sci. & Tech.

▷ SaPoster-02
Iterative Learning Control for Continuous-Time Distributed Parameter Systems with Varying Trial Lengths
Yao, Chuang — Guangxi Univ. of Sci. & Tech.
Dai, Xisheng — Guangxi Univ. of Sci. & Tech.
Wang, Zhengcui — Guangxi Sci. & Tech. Normal Univ.
Tian, Senping — South China Univ. of Tech.

▷ SaPoster-03
Sample-Efficient Reinforcement Learning via Adversarial Self-Loop Dynamics Modeling
Liang, Yuchen — Xi'an Jiaotong Univ.
Zhang, Fukai — Shandong Univ.
Wang, Cong — Shandong Univ.
Liu, Yuehu — Xi'an Jiaotong Univ.

▷ SaPoster-04
Reward-Guided Subspace Fusion and Spotlight for Multi-Agent State Space Exploration
Luo, Jiali — Xi'an Jiaotong Univ.
Liang, Yuchen — Xi'an Jiaotong Univ.
Liu, Yuehu — Xi'an Jiaotong Univ.
Zhang, Chi — Xi'an Jiaotong Univ.

▷ SaPoster-05
A Mobile Manipulator Garbage Grasping Method Based on the Integration of Diffusion Model and Control Network
Fan, Weiqi — Hainan Univ.
Zhang, Xiyuan — Hainan Univ.
Zhang, Zhonghao — Hainan Univ.
Shen, Yanglin — Hainan Univ.
Chen, Yujing — Hainan Univ.
Guo, Dongsheng — Hainan Univ.

▷ SaPoster-06
Verifying An Efficient Structure Slimming Method for Spiking Neural Networks
Xu, Hengyuan — Sichuan Univ.
Wang, Junqiao — Sichuan Univ.
Wu, Kunyu — Sichuan Univ.
Qu, Zhengyi — Univ. of California, Riverside
Ouyang, Yuqi — Sichuan Univ.
Qian, Guangwu — Sichuan Univ.

▷ SaPoster-07
HSS-UNet: A Hybrid State Space Reconstruction Network for Anomaly Detection of Catenary Fasteners
Hong, Weijia — Southwest Jiaotong Univ.

▷ SaPoster-08
Heterogeneous Network Rumor Propagation Considering Forgetting and Hot Topic Effects
Hu, Wenyan — Beihang Univ.
Ai, Jingxuan — Harbin Inst. of Tech.

▷ SaPoster-09
A Pose Estimation Approach for Uncooperative Spacecraft Utilizing Convolutional Neural Network and Temporal Information
Zhang, He — Harbin Inst. of Tech.
Zheng, Yin — Harbin Inst. of Tech.
Wang, Yan — Harbin Inst. of Tech.

▷ SaPoster-10
Probability-Aware Multi-Scale Consistency Network for Robust Point Cloud Registration
Huan, Wang — Shandong Univ.

Liu, Guoliang — Shandong Univ.
Qing, Ma — Shandong Univ.
Huang, Zhun — China Flight Test Establishment
Yang, Chaodong — China Flight Test Establishment
Wang, Huanlin — China Flight Test Establishment

▷ SaPoster-11

Cross-Batch Graph Attention-Based Soft Sensor Modeling for Industrial Processes

Yang, Fan — Changchun Univ. of Tech.
Zhang, Xiumei — Changchun Univ. of Tech.
Yang, Junyao — Changchun Univ. of Tech.
Li, Hui — Changchun Univ. of Tech.

▷ SaPoster-12

Exploring Probabilistic Ensembling Fusion for UAV-based RGBT Visual Object Tracking

Zhang, Da — National Univ. of Defense Tech.
Kuai, Yangliu — National Univ. of Defense Tech.
Xie, Hai-Bin — National Univ. of Defense Tech.

▷ SaPoster-13

A Multi-Scale Feature Extraction and Attention Mechanism-Based Image Stitching Method

Luo, Junxuan — Central South Univ.
Cheng, Xin-Ming — Central South Univ.
Zhang, Wei — Central South Univ.
He, Jian Biao — Central South Univ.

▷ SaPoster-14

PD-YOLO: A Multi-scale Pavement Damage Detection Algorithm Based on Wavelet Transform and Global Attention

Shi, Changteng — Shandong Univ.
Liu, Guoliang — Shandong Univ.
Lu, Zhicong — Shandong Univ.
Tian, Guohui — Shandong Univ.

▷ SaPoster-15

Pipeline Inner Wall Defect Detection Based on ALW-YOLO

Li, Yixuan — Beijing Forestry Univ.
Chen, Fangzhou — Beijing Forestry Univ.
Xiong, Chenxiang — Beijing Forestry Univ.
Xu, Rui — Beijing Forestry Univ.
Liang, Enyu — Beijing Forestry Univ.
Fan, Lifu — Beijing Forestry Univ.
Li, Chengxuan — Beijing Forestry Univ.
Chen, Shichao — Chinese Acad. of Sci.
Yan, Lei — Beijing Forestry Univ.

▷ SaPoster-16

Transmission Tower Detection Based on STPP-YOLO Network

Zeng, Zhi — Guangdong Power Grid Co., Ltd.

▷ SaPoster-17

Point Cloud Registration Optimization Algorithm Based on Two-Level RANSAC and Improved GICP

Xu, Sufan — Shandong Univ.
Shang, Jianhang — Shandong Univ.
Liu, Guoliang — Shandong Univ.
Yang, Chaodong — China Flight Test Establishment
Song, Xilin — China Flight Test Establishment
Zhang, Xiaogang — China Flight Test Establishment

▷ SaPoster-18

Feature Extraction of Sublingual Veins for Auxiliary Diagnosis of Type 2 Diabetes Mellitus

Leng, Kun — Zhengzhou Univ.
Zhao, Yuping — China Acad. of Chinese Medical Sci.
Wang, Shaoli — Guang'anmen Hospital
Ren, Haichuan — Zhengzhou Univ.
Liu, Xudong — Zhengzhou Univ.
Peng, Linjing — China Acad. of Chinese Medical Sci.
Luo, Nan — Guang'anmen Hospital
Liu, Yige — Zhengzhou Univ.

▷ SaPoster-19

Path Planning of Manipulator Arm Based on Digital Twin VR

Zhu, Ziqing — Southwest Jiaotong Univ.
Liang, Kening — Southwestern Univ. of Transportation & Communication
Liu, Xiao — Southwest Jiaotong Univ.
Chen, Chu Han — Southwest Jiaotong Univ.
Jia, Yuchuan — Southwest Jiaotong Univ.

▷ SaPoster-20

Gas Leakage Source Localization Method on Assisted Population-Decision Disturbance Grey Wolf Optimizer

Yao, Haiyan — Hangzhou Electric Power Equipment Manufacturing Co., Ltd
Guo, Qiang — Hangzhou Electric Power Equipment Manufacturing Co., Ltd
Lu, Bin — Hangzhou Electric Power Equipment Manufacturing Co., Ltd
Zhang, Xufeng — Hangzhou Electric Power Equipment Manufacturing Co., Ltd
Miao, Yufeng — Hangzhou Electric Power Equipment Manufacturing Co., Ltd
Jin, Lingzhu — Hangzhou Electric Power Equipment Manufacturing Co., Ltd
Lou, Yujing — Hangzhou Electric Power Equipment Manufacturing Co., Ltd
Yuan, Jiahao — Hangzhou Univ.

▷ SaPoster-21

A Mode-Adaptive LSTM Approach for UAV Trajectory Prediction via Flight Mode Recognition

Lan, Xuejing — Guangzhou Univ.
Chen, Zhanyu — Guangzhou Univ.
Liu, Hanjie — Guangzhou Univ.
Zhang, Jun — Guangzhou Univ.
Zhao, Zhijia — Guangzhou Univ.

Sunday, May 18, 2025

SuA01 13:30–15:30 三楼北京厅
Special Session: Modeling and Intelligent Control of Complex Systems (2)

Organizer: Xing, Shuangyun — Shenyang Jianzhu Univ.
Organizer: Zhao, Xueyan — South China Univ. of Tech.
Organizer: Deng, Feiqi — South China Univ. of Tech.
Chair: Xing, Shuangyun — Shenyang Jianzhu Univ.
Co-Chair: Zhao, Xueyan — South China Univ. of Tech.
Co-Chair: Deng, Feiqi — South China Univ. of Tech.

▶ SuA01-6 15:10–15:30
Signal Compensation-Based Predictive Functional Control for In-wheel Motor of Electric Vehicle
Ren, Haonan — Liaoning Petrochemical Univ.
Xiang, Wei — Liaoning Petrochemical Univ.
Shi, Huiyuan — Liaoning Petrochemical Univ.
Qiu, Xiaolu — Liaoning Petrochemical Univ.

▶ SuA01-2 13:50–14:10
A Robust Signal Compensated Prediction Approach for the Diesel Hydrogenation Process via Virtual Unmodeled Dynamics
Ding, Qiming — Liaoning Petrochemical Univ.
Peng, Bo — Univ. of Sci. & Tech. Liaoning
Shi, Huiyuan — Liaoning Petrochemical Univ.
Qiu, Xiaolu — Liaoning Petrochemical Univ.

▶ SuA01-3 14:10–14:30
Prediction Compensation Enhanced Robust Model Predictive Control for Injection Process
Peng, Bo — Univ. of Sci. & Tech. Liaoning
Ding, Qiming — Liaoning Petrochemical Univ.
Shi, Huiyuan — Liaoning Petrochemical Univ.
Li, Ping — Liaoning Petrochemical Univ.

▶ SuA01-4 14:30–14:50
Two-dimensional Off-policy Self-learning Control for Batch Processes with Unmodeled Dynamics
Li, Yan — Liaoning Petrochemical Univ.
Gao, Jianming — Liaoning Petrochemical Univ.
Qiu, Xiaolu — Liaoning Petrochemical Univ.
Su, Chengli — Liaoning Petrochemical Univ.
Shi, Huiyuan — Liaoning Petrochemical Univ.

▶ SuA01-5 14:50–15:10
2D Iterative Learning Predictive Control with Disturbance Input for Asynchronous Multi-phase Batch Processes
Gao, Jianming — Liaoning Petrochemical Univ.
Li, Yan — Liaoning Petrochemical Univ.
Qiu, Xiaolu — Liaoning Petrochemical Univ.
Shi, Huiyuan — Liaoning Petrochemical Univ.

▶ SuA01-6 15:10–15:30
Signal Compensation-Based Predictive Functional Control for In-wheel Motor of Electric Vehicle
Ren, Haonan — Liaoning Petrochemical Univ.
Xiang, Wei — Liaoning Petrochemical Univ.
Shi, Huiyuan — Liaoning Petrochemical Univ.
Qiu, Xiaolu — Liaoning Petrochemical Univ.

SuA02 13:30–15:30 三楼香港厅I
Special Session: Neural Networks-Based Adaptive Learning Control for Nonlinear Systems

Organizer: Liu, Chong — Xi'an Univ. of Architecture & Tech.
Organizer: Su, Hanguang — Northeastern Univ.
Organizer: Luo, Yanhong — Northeastern Univ.
Chair: Liu, Chong — Xi'an Univ. of Architecture & Tech.
Co-Chair: Su, Hanguang — Northeastern Univ.
Co-Chair: Luo, Yanhong — Northeastern Univ.

▶ SuA02-1 13:30–13:50
Distributionally Robust Optimal Power Flow Considering Renewable Energy and Load Uncertainties
Zhai, Baitong — Northeastern Univ.
Luo, Yanhong — Northeastern Univ.
Yang, Dongsheng — Northeastern Univ.
Suslov, Konstantin — Irkutsk National Research Technical Univ. and National Research Univ. Moscow Power Engineering Inst.

▶ SuA02-2 13:50–14:10
Dynamic Event-triggered Robust Optimal Control for Nonlinear Switched Systems with Perturbations
Yang, Bingjie — Xi'an Univ. of Architecture & Tech.
Liu, Chong — Xi'an Univ. of Architecture & Tech.
Wang, Leiming — Xi'an Univ. of Architecture & Tech.
Liu, Fengyuan — Xi'an Univ. of Architecture & Tech.

▶ SuA02-3 14:10–14:30
A Controller Design of Variable Wingspan Aircraft Based on Adaptive Dynamic Programming
Tian, Yujie — Beihang Univ.
Zhang, Kun — Beihang Univ.
Meng, Xiang Rui — Univ. of Sci. & Tech. Beijing

▶ SuA02-4 14:30–14:50
A Collaborative Task Allocation and Path Planning Method for Multi-Unmanned Vehicles Based on Dynamic Energy Consumption Optimization
Li, Zufeng — Chongqing Tech. & Business Univ.
Fan, Jiarui — Chongqing Tech. & Business Univ.
Liu, Pengda — Chongqing Tech. & Business Univ.
Zhang, Huiyan — Chongqing Tech. & Business Univ.

▶ SuA02-5 14:50–15:10
Dynamic Event-triggered Adaptive Optimal Control for Nonlinear Systems by Using Experience Replay
Kang, Jintao — Xi'an Univ. of Architecture & Tech.
Liu, Chong — Xi'an Univ. of Architecture & Tech.
Wang, Leiming — Xi'an Univ. of Architecture & Tech.
Liu, Fengyuan — Xi'an Univ. of Architecture & Tech.

▶ SuA02-6 15:10–15:30
Event-Driven Adaptive Optimal Control of a Class of Unknown Nonlinear Systems via Generalized Fuzzy Hyperbolic Models
Li, Tao — Northeastern Univ.
Zhu, Jiansong — Northeastern Univ.
Su, Hanguang — Northeastern Univ.
Bai, Yuanyuan — Northeastern Univ.

SuA03 13:30–15:30 三楼香港厅II
Regular Session: Adaptive Dynamic Programming and Reinforcement Learning (3)

Chair: Zhang, Yongwei — South China Agricultural Univ.
Co-Chair: Zhang, Yi — Shenyang Univ. of Tech.

▶ SuA03-1 13:30–13:50
Event-Driven Optimal Formation Control of Nonlinear Multi-Agent Systems Through Reinforcement Learning
Zhong, Qing — South China Agricultural Univ.
Shao, Xinyuan — South China Agricultural Univ.
Luo, Zhicong — South China Agricultural Univ.
Zhang, Shunchao — Guangdong Univ. of Finance
Zhang, Yongwei — South China Agricultural Univ.

▶ SuA03-2 13:50–14:10
A Reinforcement Learning Framework for Portfolio Optimization via Sequence Prediction
Zhang, Xiaoyan — Sun Yat-sen Univ.
Ren, Shufei — Sun Yat-sen Univ.
Shi, Runhao — Sun Yat-sen Univ.
Zhang, Yunong — Sun Yat-sen Univ.

▶ SuA03-3 14:10–14:30
Dynamic Event-triggered-based Near Optimal Control for Solving Mixed Zero-sum Games via Adaptive Dynamic Programming
Xie, Mengjia — Shenyang Univ. of Tech.
Liang, Yuling — Shenyang Univ. of Tech.
Ming, Zhongyang — Northeastern Univ.
Han, Yang — Shenyang Univ. of Tech.

▶ SuA03-4 14:30–14:50
Synchronization in Multiagent Systems via Transfer Reinforcement Learning
Zhang, Yisheng — Liaoning Petrochemical Univ.
Bai, Zixuan — Liaoning Petrochemical Univ.

▶ SuA03-5 14:50–15:10
Sliding Mode-based Regulation Control for Nonlinear System with Disturbances via Reinforcement Learning

Qin, Feng — Shenyang Univ. of Tech.
Zhang, Yi — Shenyang Univ. of Tech.
Liang, Yuling — Shenyang Univ. of Tech.
Li, Dong — Shenyang Univ. of Tech.
Chen, Junyan — Hangzhou Dianzi Univ.

▶ SuA03-6 15:10–15:30

Distributed Neural Network Fixed-Time Consensus Control for Multiple Manipulators System with Input Deadzone

Zhan, Haoran — Univ. of Electronic Sci. & Tech. of China
Cao, Yuanchao — Univ. of Electronic Sci. & Tech. of China
Chen, Xin — Univ. of Electronic Sci. & Tech. of China
Chao, Tao — Harbin Inst. of Tech.
Zhang, Jiyu — Hangzhou RoboCT Tech. Development Co., Ltd.
Qing, Guo — Univ. of Electronic Sci. & Tech. of China

SuA04 13:30–15:30 三楼澳门厅I

Regular Session: Neural Network-based Control

Chair: Tan, Xiangmin — Chinese Acad. of Sci.
Co-Chair: Jiang, Haijun — Xinjiang Univ.

▶ SuA04-1 13:30–13:50

Neural Network Based Fixed-Time Adaptive Consensus Tracking for A Class of Uncertain Nonlinear Multiagent Systems

Xiong, Guanghuan — Chinese Acad. of Sci.
Tan, Xiangmin — Chinese Acad. of Sci.
Cao, Guanzhen — Chinese Acad. of Sci.
Hong, Xingkui — Chinese Acad. of Sci.

▶ SuA04-2 13:50–14:10

A Multi-objective Feature Selection Algorithm Based on a New Feature Subsets Adjustment Strategy

Guan, Shihao — Xi'an Technological Univ.
Guo, Xiaofang — Xi'an Technological Univ.

▶ SuA04-3 14:10–14:30

Pole-Assignment Aided ZN (Zhang Neurodynamics) Controllers for Time-Varying Linear Systems (TVLS) as an Attempt

Huang, Junyang — Sun Yat-sen Univ.
Zhang, Yunong — Sun Yat-sen Univ.
Liu, Jason J. R. — Univ. of Macau

▶ SuA04-4 14:30–14:50

Deep Neural Networks Based Aperiodic Intermittent Control for Practical Fixed-Time Stability of Unknown Nonlinear Systems

Zhang, Juntao — Xinjiang Univ.
Wang, Qiyu — Xinjiang Univ.
Liu, Shuxin — Xinjiang Agricultural Univ.
Jiang, Haijun — Xinjiang Univ.
Abdurahman, Abdujelil — Xinjiang Univ.

▶ SuA04-5 14:50–15:10

Operator Learning for Robust Stabilization of Linear Markov-Jumping Hyperbolic PDEs

Zhang, Yihuai — Hong Kong Univ. of Sci. & Tech. (Guangzhou)
Yu, Huan — Hong Kong Univ. of Sci. & Tech. (Guangzhou)

▶ SuA04-6 15:10–15:30

Multi-Mode MPC-Based Control of Exhaust Temperature and Load in a Gas Turbine

Liu, Sixun — China United Gas Turbine Tech. Co., Ltd.
Zhang, Xuan — China United Gas Turbine Tech. Co., Ltd.
Xie, Jinyu — China United Gas Turbine Tech. Co., Ltd.
Li, Junkun — China United Gas Turbine Tech. Co., Ltd.
Cai, Xidong — China United Gas Turbine Tech. Co., Ltd.
Wang, Jinjian — China United Gas Turbine Tech. Co., Ltd.

SuA05 13:30–15:30 三楼澳门厅II

Regular Session: System Analysis for Intelligent Agents

Chair: Lin, Qiao — Univ. of Nottingham Ningbo
Co-Chair: Li, Junyang — Ocean Univ. of China

▶ SuA05-1 13:30–13:50

Swarm Intelligence-Based Auxiliary Diagnosis System

Wan, Jiayu — Univ. of Nottingham Ningbo
Zhou, Yixuan — Univ. of Nottingham Ningbo
Niu, Yubao — Univ. of Nottingham Ningbo
Wu, Chengze — Univ. of Nottingham Ningbo
Yu, Fan — Univ. of Nottingham Ningbo
Lin, Qiao — Univ. of Nottingham Ningbo

▶ SuA05-2 13:50–14:10

Simulation Analysis of Wave-following Performance of Buoys Based on AQWA

Li, Jiefei — Ocean Univ. of China
Zhu, Xiu — Ocean Univ. of China
Wen, Qi — Ocean Univ. of China
Li, Junyang — Ocean Univ. of China

▶ SuA05-3 14:10–14:30

A Distributed Prescribed-Time Economic Dispatch Method for Port Integrated Energy System with Renewable Energy

Li, Mengyu — Dalian Maritime Univ.
Teng, Fei — Dalian Maritime Univ.

▶ SuA05-4 14:30–14:50

Optimization Design of Dovetail Joint Structure Considering Assembly Gaps

Chen, Jiali — Chinese Acad. of Sci.
Yang, Zhongyu — Chinese Acad. of Sci.
Shi, Yihang — Chinese Acad. of Sci.
Feng, Yinli — Chinese Acad. of Sci.

▶ SuA05-5 14:50–15:10

A Novel Point Cloud Registration Method with Error-Guided Threshold Adjustment Mechanism

Zheng, Yongshuai — Shandong Univ.
Liu, Guoliang — Shandong Univ.
Zhang, Tenglong — Shandong Univ.
Huang, Zhun — China Flight Test Establishment
Yang, Chaodong — China Flight Test Establishment
Yuan, Ye — China Flight Test Establishment
Tian, Guohui — Shandong Univ.

▶ SuA05-6 15:10–15:30

Overview of Control Strategies for Permanent Magnet Synchronous Motors

He, Hui Li — Shanghai Maritime Univ.

SuA06 13:30–15:30 三楼贵宾室

Regular Session: Complex Networks and Social Systems

Chair: Zhang, Yunong — Sun Yat-sen Univ.
Co-Chair: Jiang, Jin — Beijing Normal Univ.

▶ SuA06-1 13:30–13:50

Influence Mechanism of the Elderly Labor Willingness under the Background of Delayed Retirement Policy

Zhao, Tianqi — Shanghai Univ. of Engineering & Tech.

▶ SuA06-2 13:50–14:10

The Impact of Intergenerational Support on the Quality of Life of Elderly

Pan, Xiaoyan — Shanghai Univ. of Engineering Sci.

▶ SuA06-3 14:10–14:30

Future Predictions of 6 TRs, 4 WSCSs, and 4 WRCTs via Comte and Zhang et al.'s Thoughts

Zhang, Yunong — Sun Yat-sen Univ.
Zhang, Yiyang — Sun Yat-sen Univ.
Tan, Zhiguo — Guangzhou Panyu Polytechnic

▶ SuA06-4 14:30–14:50

Analysis of a Nation's Trade Position Based on Industrial Heterogeneity

Xia, Tinghan — Beijing Normal Univ.
Jiang, Jin — Beijing Normal Univ.
Hai, Yingqi — Beijing Normal Univ.
Hu, Wenbin — Univ. of Massachusetts Amherst
Han, Pengfei — Tianjin Beiyang Sci. & Tech. Research Inst.
Xiao, Mingzhong — Beijing Normal Univ.

▶ SuA06-5 14:50–15:10

Resilience Measurement for Global Industrial System Based on Causal Emergence

Zhang, Xu — Fudan Univ.
Han, Dingding — Fudan Univ.

▶ SuA06-6 15:10–15:30

Cascading Failure in Fractal Scale-free Networks

Guo, Feiyan — Beijing Normal Univ.

Poster Session SuPoster

May 18, 13:30-18:00
三楼广深厅大堂

Chair: Dong, Na — Tianjin Univ.
Co-Chair: Wang, Shenquan — Changchun Univ. of Tech.

▷ SuPoster-01

A Behavior Recognition Algorithm Based on Feature Enhancement and Pose Information and Its Application

Li, Mingxing — Jiangsu Univ.

▷ SuPoster-02

Remaining Useful Life Prediction of Lithium-Ion Batteries Based on Transformer-GRU Parallel Hybrid Network Model

Wang, Yongxin — Changchun Univ. of Tech.
Liu, Ruoqi — Changchun Univ. of Tech.
Shan, Huadi — Changchun Univ. of Tech.
Wang, Shenquan — Changchun Univ. of Tech.

▷ SuPoster-03

An Intelligent Large Knowledge Framework in Predictive Maintence

Zhou, Zixuan — Pittsburgh Institution
Sun, Hanzi — Sichuan Univ.
Qian, Guangwu — Sichuan Univ.

▷ SuPoster-04

Finite-region Fault Detection of the Two-dimensional Fornasini-Marchesini Jump Systems via Markov Process

Cai, Xinyu — Anhui Univ.
He, Shuping — Anhui Univ.
Ren, Chengcheng — Anhui Univ.
Xu, Qingyang — Anhui Univ.
Wei, Jianfei — Anhui Univ.

▷ SuPoster-05

H_∞ Control of Networked Variable-Speed Electro-Hydraulic Systems with Stochastic Sensor Measurements Losses: An Improved Markovian Pattern

Zhao, Xueqian — State Grid Beijing Electric Power Company Electric Power Sci. Research Inst.

▷ SuPoster-06

Cluster-LLM: Adaptive Real-Time Time-Series Anomaly Detection Using LLMs

Zhu, Binbin — Chinese Acad. of Sci.
Xiong, Gang — Chinese Acad. of Sci.
Yuan, Meng — Chinese Acad. of Sci.
Shen, Zhen — Chinese Acad. of Sci.
Zhu, Fenghua — Chinese Acad. of Sci.
Chen, Shichao — Chinese Acad. of Sci.
Dong, Xisong — Chinese Acad. of Sci.
Liu, Sheng — Chinese Acad. of Sci.

▷ SuPoster-07

Aerodynamic Performance Analysis for an Eagle-Inspired Flapping-Wing Aerial Vehicle

Wen, Quanqi — Univ. of Sci. & Tech. Beijing
He, Xiuyu — Univ. of Sci. & Tech. Beijing
Zhang, Haobo — Univ. of Sci. & Tech. Beijing
Fu, Qiang — Univ. of Sci. & Tech. Beijing
He, Wei — Univ. of Sci. & Tech. Beijing

▷ SuPoster-08

Agent Path Planning Based on Enhanced BAS with Kinematics-constrained APF Algorithm

Ma, Junjie — Hainan Univ.
Xue, Shan — Hainan Univ.

▷ SuPoster-09

Adaptive Path Planning for AGVs with Enhanced RRT and Dynamic Window Approach*

Yang, Shifei — Anhui Univ.
Xin, Jiyuan — Anhui Univ.
Su, Yanxu — Southeast Univ.

▷ SuPoster-10

Dynamic Convergence Factor Optimized Genetic Algorithm for Multi-UAV Path Planning in Powerline Inspection

Liang, Siyu — Tianjin Univ.
Dong, Na — Tianjin Univ.
Chen, Yuandong — Tianjin Univ.
Song, Jimin — Tianjin Univ.
Xu, Ruizhe — Tianjin Univ.

▷ SuPoster-11

Molecular Spiking Neuron System Based on Spike Timing-dependent Plasticity

Xiong, Li — Dalian Univ.
Lv, Hui — Dalian Univ.

▷ SuPoster-12

Adaptive Fixed-Time Stabilization for Nonlinear Systems with Low-Order and High-Order Growth Conditions

Ye, Zhijie — Nanjing Univ. of Sci. & Tech.
Chen, Weimin — Nanjing Univ. of Sci. & Tech.
Wang, Xue — Nanjing Univ. of Sci. & Tech.

▷ SuPoster-13

Collaborative Control Method of Quadrotor UAVs with Cloud-Edge Collaboration

Wang, Yuankui — Hohai Univ.
Chen, Shichao — Chinese Acad. of Sci.
Li, Chengxuan — Beijing Forestry Univ.

▷ SuPoster-14

A Fractional-Order Backstepping Controller with Quadratic Lyapunov Function for Rotor Displacement Control in Active Magnetic Bearings

Long, Hanyan — Northeastern Univ.
Wu, Zehan — Northeastern Univ.

▷ SuPoster-15

Fault Propagation Control for Industrial Processes Based on Two-Layer Network and Reinforcement Learning

Zhong, Xiaojing — Guangzhou Univ.
Liang, Kunkai — Guangzhou Univ.
Zou, Tao — Guangzhou Univ.

▷ SuPoster-16

Adaptive Displacement Constraint Control with Tan-Type Time-Varying Barrier Lyapunov Functions for Active Magnetic Bearings

Wu, Zehan — Northeastern Univ.
Long, Hanyan — Northeastern Univ.

▷ SuPoster-17

A Deep Multi-task Learning Method for E-learning Behavior Analysis

Chen, Junrui — Chinese Acad. of Sci.
Shen, Zhen — Chinese Acad. of Sci.
Zhu, Yilin — University of Science Malaysia
Xiong, Gang — Chinese Acad. of Sci.
Liu, Xiwei — Chinese Acad. of Sci.

▷ SuPoster-18

A Predictive Optimization Framework for Stability-Constrained Obstacle Avoidance and Anti-Swing Motion Planning of Overhead Cranes

Yan, Shipeng — Shandong Univ.
Liu, Guoliang — Shandong Univ.
Guo, Qingqiang — Shandong Univ.

▷ SuPoster-19

Iterative Learning Control Method with Safety Velocity of Mobile Robot under Uncertain Motion Environment

Dang, Boyu — Northeastern Univ.
Li, Haiyan — Northeastern Univ.

▷ SuPoster-20

Earlier Times in Front: Regardless of Comparison Sequence ,Temporal Focus or Temporal Relative Span

Xu, Xinyu — Chinese Acad. of Sci.
Liu, Ye — Chinese Acad. of Sci.

▷ SuPoster-21

Multi-modal Vehicle-Infrastructure Collaborative Perception via Deformable Attention Mechanism

Zhang, Zhenyu — Beihang Univ.
Shi, Junyi — Beihang Univ.
Pang, Haobing — Beihang Univ.
Wang, Mingqian — Beihang Univ.
Zhou, Jianshan — Beihang Univ.
Tian, Daxin — Beihang Univ.
Zheng, Changshui — Beihang Univ.
Liu, Zhiyu — Beihang Univ.

Event Notice (Presentation Instructions)

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☒Timing: A maximum of 20 minutes in total, including 2 minutes for Q&A. Please make sure your presentation is well timed.
☒All oral session rooms are equipped with data projectors with a standard VGA connector. The speakers could also bring and use their own laptops or other presentation devices. Please check the compatibility of your laptop and the projector before the session starts.
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CSIS-IAC 2026 Call for Papers

CFP | Welcome Submissions for the 2026 International Annual Conference on Complex Systems and Intelligent Science (CSIS-IAC 2026)

The 2026 International Annual Conference on Complex Systems and Intelligent Science (CSIS-IAC 2026) will be held in Shenzhen, China, from May 15 to May 17, 2026. Organized by Southern University of Science and Technology, in cooperation with IEEE and the Institute of Automation, Chinese Academy of Sciences (CAS), this conference aims to provide a platform for experts, scholars, and engineering professionals in the field of complex systems and intelligent science to showcase their latest research findings and further advance both theoretical and applied aspects of related disciplines. We welcome experts, scholars, and students to participate through paper submissions, invited sessions, and other means. The submission deadline for the conference is March 31, 2026, and you can visit the conference website at

http://www.csisiac.org/

The CSIS-IAC 2026 conference proceedings will be published by IEEE and indexed in EI.

We look forward to your active participation and collaborative exploration of cutting-edge issues in complex systems and intelligent science at the Annual Conference in Shenzhen. If you have any questions or need further information, please feel free to contact us at Email: csisiac@gmail.com.

CFP | 欢迎投稿 2026 复杂系统与智能科学国际年会(CSIS-IAC 2026)

2026复杂系统与智能科学国际年会 (2026 International Annual Conference on Complex Systems and Intelligent Science, CSIS-IAC 2026) 将于2026年5月15日–17日在中国深圳举行。会议由南方科技大学承办, IEEE和中科院自动化研究所协办, 旨在为复杂系统与智能科学领域专家学者与工程技术人员搭建展示最新研究成果的平台, 并进一步推动相关领域理论与应用的发展。欢迎专家、学者及学生以投稿、组织邀请组等形式参会, 会议征稿截止日期为2026年3月31日, 会议网址: http://www.csisiac.org

CSIS-IAC 2026会议论文集将由IEEE出版, 并由EI检索。

我们期待着您的积极参与, 并共同在深圳的年会上深入探讨复杂系统与智能科学的前沿问题。如有任何疑问或需要进一步信息, 请随时联系我们Email: csisiac@gmail.com。


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