Special Session VII

Special Session Basic Information:

专栏题目 Session Title	中文：人工智能驱动的智能电网先进储能系统优化、控制与安全管控 英文：Artificial Intelligence-Driven Optimization, Control, and Safety Management of Advanced Energy Storage Systems in Smart Grids

专栏介绍和征稿主题
Introduction and topics

中文：

本专栏聚焦人工智能在智能电网与先进储能系统中的应用与前沿技术，涵盖储能系统优化配置、智能调度、运行控制与安全管控等核心领域。随着新能源比例的提升，电力系统面临间歇性、波动性和不确定性增加的挑战，先进储能系统在负荷平衡、峰谷调节、频率调节及电能质量保障等方面发挥关键作用。重点关注利用人工智能、大数据分析、机器学习、深度强化学习及数字孪生技术，解决储能系统容量优化、能效提升、寿命管理、故障预测与智能决策问题。

征稿主题

（1）AI 驱动的储能系统优化配置与运行调度；
（2）储能系统智能控制、预测与自适应决策；
（3）储能系统安全管控与风险评估；
（4）储能系统数字孪生建模与数据驱动监测；
（5）电化学储能系统寿命预测与健康管理；
（6）多能互补系统中储能的智能协同控制；
（7）智能储能系统在低碳与高可靠电网中的应用；
（8）智能电网中储能系统的网络安全与故障诊断。

英文：

Introduction

This session focuses on the application and cutting-edge technologies of artificial intelligence in smart grids and advanced energy storage systems. It covers key areas such as energy storage system optimization, intelligent scheduling, operational control, and safety management. With the increasing penetration of renewable energy, power systems face greater intermittency, volatility, and uncertainty. Advanced energy storage systems play a critical role in load balancing, peak-shaving, frequency regulation, and power quality assurance. The session emphasizes the use of artificial intelligence, big data analytics, machine learning, deep reinforcement learning, and digital twin technologies to address challenges such as capacity optimization, efficiency improvement, life-cycle management, fault prediction, and intelligent decision-making in energy storage systems.

Topics

(1)AI-driven optimization and scheduling of energy storage systems;
(2)Intelligent control, prediction, and adaptive decision-making for storage systems;
(3)Safety management and risk assessment of energy storage systems;
(4)Digital twin modeling and data-driven monitoring of energy storage systems;
(5)Life-cycle prediction and health management of electrochemical storage systems;
(6)Intelligent coordinated control of storage in multi-energy complementary systems;
(7)Applications of intelligent energy storage systems in low-carbon and high-reliability grids;
(8)Cybersecurity and fault diagnosis of energy storage systems in smart grids.

Special Session Chair(s):

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Organizer's Brief Biography

中文：博士，副教授，博士生导师，丹麦奥尔堡大学访问学者，IEEE PES 中国区青年专家委员会副秘书长，担任多个 SCI 国际学术期刊、国内电力行业相关期刊的审稿人。在《中国电机工程学报》、《CSEE Journal of Power and Energy Systems》、《IEEE Transactions on Sustainable Energy》、《电工技术学报》、《高电压技术》、《电网技术》等高水平期刊上发表论文 30 余篇，均被 SCI/EI 检索；发表在“IEEE Transactions on Sustainable Energy”的论文获得 ESI 全球排名前 1%高被引论文；参与编著书籍《固体电蓄热及可再生能源消纳技术》、《清洁能源工程技术原理与应用》2 部；申请发明专利 25 项；曾获得沈阳市科技进步一等奖 1 项，沈阳市自然科学学术成果奖 1 项，教育部国际合作优胜奖 IEEE PCCC Outstanding Young Engineer Award。

英文：PhD, Associate Professor, PhD Supervisor, Visiting Scholar at Aalborg University, Denmark, Deputy Secretary-General of the IEEE PES China Youth Experts Committee, and reviewer for multiple SCI international academic journals and domestic power industry-related journals. She has published over 30 papers in high-level journals, including China Electric Power Engineering Journal, CSEE Journal of Power and Energy Systems, IEEE Transactions on Sustainable Energy, Journal of Electrical Engineering, High Voltage Technology, Grid Technology, all indexed by SCI/EI. Her paper published in IEEE Transactions on Sustainable Energy was ranked in the top 1% of highly cited papers globally by ESI. She contributed to the books Solid-State Electric Storage and Renewable Energy Integration Technologies and Principles, Applications of Clean Energy Engineering Technology. She has applied for 25 invention patents. She has received several awards, including the First Prize for Scientific and Technological Progress in Shenyang, the Shenyang Natural Science Academic Achievement Award, and the Ministry of Education International Cooperation Excellence Award, as well as the IEEE PCCC Outstanding Young Engineer Award.

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Organizer's Brief Biography

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英文： Hejun Yang, PhD, Associate Professor, PhD Supervisor, Anhui Provincial Young Scholar, Visiting Scholar at Aalborg University and Yuan Ze University. He has led some research projects including the national natural science foundation of China, Anhui provincial natural science foundation, funds of the state key laboratory, the fundamental research funds for the central universities of China, etc. And He has led some teaching research projects including provincial level and university's level and college's level. He has published more than 60 papers in journals (e.g., IEEE, IET, JES) and conferences and authorized (applied) more than 40 patents. He has received several awards. His main research interests focus on areas of power system planning and reliability, and energy storage planning and operations, new power electric distribution system operation and commercial mode.

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Organizer's Brief Biography

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英文： Qinghan Wang, PhD, Aalborg University, Denmark, Postdoctoral Researcher, Tsinghua University& Sichuan Energy Internet Reaserch Institute(Qinghua University), and reviewer for multiple SCI international academic journals. He has published more than ten papers in high-level journals and conferences, including Applied Energy and Energy, all indexed by SCI/EI. His main research interests include energy management strategies, optimal operation of integrated energy systems, and multi-agent systems.