

Special Session I

Special Session Basic Information:

专栏题目 Session Title

中文：面向多资源、多系统、多场景电力系统规划的先进优化运行方法
英文：Advanced optimal operation methods for power system planning oriented to multi-resource, multi-system, and multi-scenario contexts

专栏介绍和征稿主题 Introduction and topics

专栏介绍：

中文：

随着能源转型的加速推进，电力系统正朝着多资源整合、多系统协同、多场景适用的复杂方向演进。风电、光伏等可再生能源的大规模接入给电力供应的稳定性带来严峻挑战，极端天气频发对系统规划运行的前瞻性、科学性提出了更高的要求。为应对这些挑战，一系列关键技术成为突破方向：极端场景下电力系统运行风险评估精准量化台风暴雨等灾害对电网的影响，为规划阶段规避风险提供依据；可再生能源发电与储能系统规划结合源荷特性，实现双端能力的最优匹配；概率预测等先进不确定性分析技术通过鲁棒优化、随机优化等手段，有效抑制系统波动，保障系统稳定运行；综合能源系统的故障辨识与处理依托智能算法快速定位并制定解决方案，切实保障系统运行安全；多元业务协同优化技术统筹“源网荷储充”全链条资源，实现能源高效利用。本次专题会议聚焦上述领域的前沿技术，旨在展现这些技术在提升可再生能源系统稳定、可靠、高效运行的潜力。会议致力于探索创新方法，推动各关键技术的深度融合与突破，为提升电力系统规划运行水平、助力能源转型目标实现提供有力支撑。

英文：

With the accelerated advancement of energy transition, power systems are evolving toward a complex direction featuring multi-resource integration, multi-system coordination, and multi-scenario adaptability. The large-scale integration of renewable energy sources such as wind power and photovoltaic (PV) power poses severe challenges to the stability of power supply. Frequent extreme weather events have raised higher requirements for the forward-looking and scientific nature of system planning and operation. To address these challenges, a series of key technologies have become breakthrough directions: precise quantification of power system operation risks under extreme scenarios, assessing the impact of disasters like typhoons and rainstorms on the power grid, providing a basis for risk avoidance in the planning stage. Integration of renewable energy generation and energy storage system planning based on source-load characteristics, achieving the optimal matching of dual-end capabilities. Advanced uncertainty analysis techniques such as probabilistic forecasting, effectively suppressing system fluctuations through robust optimization and stochastic optimization, ensuring stable system operation. Fault identification and handling in integrated energy systems relying on intelligent algorithms to quickly locate and formulate solutions, effectively ensuring system safety and operation. Multi-business collaborative optimization technology coordinating the entire chain of resources from "generation, transmission, distribution, storage, and charging", achieving efficient energy utilization. This special topic conference focuses on the cutting-edge technologies in these areas, aiming to showcase their potential in enhancing the stability, reliability, and efficiency of renewable energy systems. The conference is dedicated to exploring innovative methods and promoting the deep integration and breakthroughs of key technologies, providing strong support for improving the planning and operation level of power systems and facilitating the realization of energy transition goals.

征稿主题

中文：

1. 极端天气条件下电力系统运行风险评估
2. 可再生能源发电与储能系统规划的先进优化方法
3. 可再生能源系统运行的不确定性优化技术
4. 综合能源系统的故障辨识与处理方法
5. 新型配用电系统多元业务高效协同优化技术

英文:

- 1.Operational Risk Assessment of Power Systems Under Extreme Weather Conditions
- 2.Advanced Optimization Methods for Renewable Energy Generation System Planning
- 3.Uncertainty Optimization Technology for Renewable Energy System Operation
- 4.Fault Identification and Handling Methods for Integrated Energy Systems
- 5.Efficient Collaborative Optimization Technology for Multi-Service in New-Style Power Distribution and Consumption Systems

Special Session Chair(s):

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Organizer's Brief Biography

中文: 张聪, 男, 博士, 湖南省衡阳市祁东县人, 湖南大学电气与信息工程学院副教授, 博士生导师, 湖湘青年英才、长沙市杰出青年人才、湖南大学岳麓学者、青年教师托举计划获得者, 电力应急技术湖南省工程研究中心青年骨干。IEEE Member, 担任 IEEE Trans. Power Syst./ Smart Grid/Sust. Energy 等国际电力领域权威期刊审稿专家。。主要从事新型电力系统防灾应急、电力系统不确定性分析、安全裕度评估与优化、配电网数字化管控、储能规划调度与运行控制等方向的研究。

英文: Cong Zhang received the D. degree in mathematics from the School of Mathematics in South China, University of Technology, Guangzhou, China, in 2013. He is currently an Associate Professor with the College of Electrical and Information Engineering, Hunan University, Changsha, China. He began to research electrical engineering. His research interests include reactive power optimization, incorporating uncertainties, and interval power flow analysis.

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Organizer's Brief Biography

中文：张宽，男，1994年7月生，副教授、硕士生导师，新能源电力系统国家重点实验室固定研究人员。主要研究领域为电氢融合能源系统优化运行、虚拟电厂聚合调控与能量管理。近年来，主持国家自然科学基金青年基金项目1项，智能电网国家科技重大专项子课题1项，博士后面基金项目1项，国家自然科学基金企业创新发展联合基金项目子课题1项，参与国家电网和南方电网科技项目10余项。以第一/通讯作者发表SCI一/二区期刊论文12篇，其中ESI高被引论文2篇，授权国家发明专利10项，承担本科与研究生理论课程各一门。

英文：Kuan Zhang received the B.Sc. degree in electrical engineering from Hainan University, Haikou, China, in 2017, and the Ph.D. degree in electrical engineering from Hunan University, Changsha, China, in 2022. He is currently an Associate Professor with the College of Electrical and Electronic Engineering, North China Electric Power University, Beijing, China. His main fields of research include operation and planning of smart grid, optimal operation of electricity and hydrogen integrated energy systems, and energy management for virtual power plants.



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Organizer's Brief Biography

中文：王玉翠，河北廊坊人，讲师，中国电机工程学会和中国电工技术学会会员。2023年9月毕业于东南大学网络空间安全专业，获工学博士学位。2023年10月任职于华北电力大学电力工程系。近年来，以主研人参与国家自然科学基金重点项目1项、国家电网公司总部科技项目3项。目前以第一作者或通信作者发表论文10余篇，其中，SCI期刊论文8篇，EI期刊论文3篇。担任《南方能源建设》、《能源研究与管理》期刊青年编委，国际学术期刊《CSEE Journal of Power and Energy Systems》、《Journal of Energy Storage》等多个能源电力领域权威期刊审稿人。

英文：Yucui Wang received the Ph.D. degree from the School of Cyber Science and Engineering, Southeast University, Nanjing, China. She is currently a Lecturer with the Department of Electrical Engineering, North China Electric Power University. Her research interests include reliability analysis of the integrated energy system, and power system operation.