

Special Session X

Special Session Basic Information:

专栏题目

Session Title

中文：新型电力系统频率安全稳定关键技术

英文：Key Technologies for Frequency Security and Stability in New Power Systems

专栏介绍和征稿主题

Introduction and topics

“双碳”目标驱动下，以高比例可再生能源为核心特征的新型电力系统加速构建，传统电力系统的物理结构、运行特性与调度逻辑发生根本性变革，频率安全稳定作为电力系统可靠运行的核心基石，面临前所未有的挑战。高不确定性、波动性、间歇性新能源的大规模并网，储能、虚拟电厂等新型资源的多元接入，以及源-网-荷-储互动模式的深度重构，使得系统有功调节能力不足、频率响应特性复杂等问题凸显，传统频率安全稳定调度技术已难以适配新型电力系统的运行需求。

为此，本次学术会议特设“新型电力系统频率安全稳定关键技术”专栏，旨在汇聚国内外能源电力领域的顶尖学者、科研人员与工程技术专家，围绕新型电力系统频率安全稳定的核心科学问题与调度技术难题展开深度研讨。

本专栏聚焦但不限于以下主题：

1. 源-网-荷-储互动的新型电力系统协调调度技术；
2. 考虑频率动态特性的新型电力系统优化控制和配置策略；
3. 虚拟发电厂参与频率响应的优化配置、调度和运行控制；
4. 多场景适配的频率安全稳定调度技术；
5. 新型电力系统频率建模、评估、机理分析和优化控制；
6. 新型算法支撑的频率安全稳定调度应用；
7. 多级电网的电力平衡和省际互助协调调度。

Driven by the "dual carbon" goals, the construction of a new power system characterized by a high proportion of renewable energy is accelerating, fundamentally transforming the physical structure, operating characteristics and dispatch logic of traditional power systems. Frequency security and stability, as the cornerstone of reliable power system operation, face unprecedented challenges. The large-scale integration of highly uncertain, volatile, and intermittent new energy sources, the diverse access of new resources such as energy storage and virtual power plants, and the deep restructuring of source-grid-load-storage interaction models exacerbate issues such as insufficient active power regulation capacity, complex frequency response characteristics. Traditional frequency security and stability dispatching technologies are no longer adequate to meet the operational requirements of new power systems.

For this reason, the academic conference has specially established a section on "Key Technologies for Frequency Security and Stability in New Power Systems," aiming to bring together top scholars, researchers and engineering experts from the field of energy and power both domestically and internationally, to engage in in-depth discussions on the core scientific issues and dispatching technology challenges of frequency Security and stability in new power systems.

This column focuses on, but is not limited to, the following topics:

1. Coordination and dispatching technology for new power systems with source-grid-load-storage interaction;
2. Optimization control and configuration strategies of new power systems considering frequency dynamic characteristics;
3. Optimized configuration, dispatching and operational control of virtual power plants participating in frequency response;
4. Frequency Security and stability dispatching technologies adaptable to multiple scenarios;
5. Frequency modelling, evaluation, mechanism analysis and optimization control in new power systems;
6. Frequency Security and stability dispatching applications supported by new algorithms;
7. Power-electricity balancing and inter provincial mutual aid coordination dispatch for multi-level power grids.

Special Session Chair(s):

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英文：Mingze Zhang, Harbin University of Science and Technology, Associate Professor, Master's Supervisor, Doctoral Degree obtained from Dalian University of Technology in the field of Power System and Automation. His main research direction is the frequency safety analysis and operation control of new power systems, with particular focus on the theoretical issues of power system dispatching operation and power safety value assessment considering frequency safety and frequency spatial distribution. His research achievements have won the First Prize of Liaoning Electric Power Science and Technology Progress Award (in 2024). He has published (accepted) 32 academic papers, among which 31 are SCI/EI indexed. He serves as an editor of the international journal "Journal of Energy Science and Technology", and is a member of the editorial board of journals such as "Chinese Journal of Electrical Engineering", "Automation", "Eco Energy", "Clean Energy Science and Technology", "Journal of Electrochemistry", "Energy Lab", "Xi'an Jiaotong University Journal", "Electrical Measurement & Instrumentation", "Battery Bimonthly", and "Electric Age", a guest (principal) editor of the journal "Energy Reports", an expert of the young editorial board of the journal "Information and Control", a consultant of the journal "Energy", and an invited reviewer for journals such as "Energy", "International Journal of Electrical Power & Energy Systems", "Journal of Modern Power Systems and Clean Energy", and "Electric Power Systems Research". He is the chairperson of several international academic conferences in the field of electrical engineering.

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英文：Shen Jiakai, Ph.D., is an engineer in the Engineering Department of the Power System Research Institute of China Electric Power Research Institute and a Chartered Engineer of the IET. His main research focuses on the security and stability analysis and control of new power systems. He has served as the executive leader of two major national smart grid projects, the leader of two scientific and technological projects of the State Grid Corporation of China headquarters, and has participated in three National Natural Science Foundation projects. He has also led or participated in over ten scientific and technological projects of provincial and network companies. He has published over 30 SCI/EI/core Chinese papers and has been granted over 10 invention patents. He serves as a reviewer for journals such as "Proceedings of the CSEE", "Power System Technology", and "Electric Power Automation Equipment". He is also a guest editor for the journal "Energy Reports", a young editorial board member of two international academic journals, and the chairperson of several sub-forums at international electrical conferences such as CEEPE 2025, ICET 2025, and PSSGT 2025.

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英文：Haomin Li, a master's student at Harbin University of Science and Technology, is supervised by Associate Professor Zhang Mingze. His primary research interests include frequency security and stability as well as operational control of new power systems, and the application of artificial intelligence in power system dispatching. He has published (or had accepted) 8 academic papers, including 7 indexed by EI and 1 in a core Chinese journal.

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