///// **Special Session 15** /////

Key Technologies on Coordinated Operation and Control of Multiple Types of Resources Towards Frequency Security

◦ INTRODUCTION AND TOPICS ◦

The rapid development of renewable energy systems (RES) along with diversified energy storage resources (ESR) and high voltage direct current (HVDC) links can facilitate building the new-type power system, but also brings various challenges such as uncertainties, prominent multi temporal-spatial probabilistic balance, complex temporal coupling, and fast and frequent changes of frequency, which greatly impact the secure operation and control of the system. The conventional optimization and control theory based on single-point forecasted scenarios and system dynamic models faces huge challenges such as risk and conservatism, accuracy, and timeliness. Learning-based methods are gaining increasing attention and being successfully applied to power and energy systems. This special session focuses on the state-of-the-art optimization and control technologies including learning-based methods for the enhancement of power system dynamic security and stability. The topics of interest include but are not limited to:

• Inertia estimation and forecasting (from individual unit/aggregator/station/region to bulk power systems)
• Modeling and assessment of frequency/inertia support capacity and performance of resources
• Modeling, extraction and embedding of dynamic security constraints/rules
• Quantitative characterization of multidimensional uncertainties
• Modeling and control strategy of large-scale heterogeneous resources for frequency security
• Optimization operation embedded dynamic security rules considering large-scale heterogeneous resources
• Market design for diverse resources to provide ancillary services like inertia and frequency response
• Applications of advanced optimization and control technologies, and Safe and efficient solving algorithms
• Learning-based advanced AI techniques and their applications in enhancing frequency security
• Typical domestic and international practice cases related to frequency security enhancement

◦ SPECIAL SESSION CHAIRS ◦

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◦ PUBLICATION & SUBMISSION ◦

Submissions will be reviewed by the conference technical committees, and accepted papers will be published in IEEE EI² 2024 International Conference Proceedings, which will be submitted for inclusion in the **IEEE Xplore Digital Library**, and submitted for indexing by **EI compendex** and **Scopus**.

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‣ Submission link: https://easychair.org/conferences/?conf=ei22024

Submission Deadline: 15 October, 2024

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