

Call for Papers for the Special Session on

Advanced Methods for Reliability, Stability and Security Analysis in Complex Modern Power Systems

Organizers and Co-chairs

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Technical Outline of the Session and Topic

The integration of renewable energy sources, such as wind and solar, alongside the widespread use of power electronics, has introduced unprecedented complexity to modern power systems. Unlike traditional grids dominated by synchronous generators, these systems face unique challenges, including reduced inertia, non-linear dynamics, and variability in power generation. While power electronics enable greater flexibility and efficiency, they also complicate system stability and control. This growing complexity calls for advanced methods in stability analysis, reliability evaluation, and risk assessment to ensure secure and resilient grid operations. Innovative approaches, including cutting-edge computational tools and real-time assessment techniques, are crucial to address the dynamic and evolving nature of these systems.

Topics of this Special Session Include but are not limited to

- Stability Analysis of Large-Scale Grids with Inverter-Based Resources
- Probabilistic Methods for System Reliability and Risk Assessment
- Multi-Timescale Approaches for Complex Power System Analysis
- AI-Driven Methods for Fault Detection and Grid Stability Prediction
- Real-Time Monitoring and Control of Complex Power Networks
- Optimization Techniques for Power System Operations under Uncertainty
- Role of Energy Storage in Stability and Reliability Enhancement
- Harmonics, Resonance, and Control Challenges in Power-Electronics-Dominated Systems
- Wide-Area Measurement Systems for Stability and Security Monitoring
- Cascading Failure Analysis and Blackout Mitigation Strategies
- Digital Twin Technologies for Proactive Grid Management and Analysis

Timeline for Author

Deadline for submission of special session papers March 15, 2025

Notification of acceptance March 31, 2025

Deadline for submission of final manuscripts April 15, 2025

All the instructions for paper submission are available on the conference website.

