

Special Issue

Stability, Control, and Resilience of Future Power Systems with High Penetration of Distributed Energy Resources

Message from the Guest Editors

The global energy transition is promoting widespread integration of distributed energy resources into modern power grids. Though vital for decarbonization, high DER penetration severely challenges system stability, control and resilience. Replacing conventional synchronous generators with power-electronics-interfaced units reduces system inertia, impairs frequency and voltage regulation, and induces new oscillation risks. Meanwhile, heavy reliance on digital infrastructure heightens cybersecurity threats, further undermining power system security and resilience. This Special Issue focuses on stability, control and resilience challenges from high DER penetration in future power systems. It invites original papers offering theoretical advances and practical solutions across scales, from device-level power electronic converter control to system-level coordination of virtual power plants and electricity markets. Bridging power electronics, power systems, artificial intelligence and cybersecurity, this Special Issue aims to compile comprehensive, forward-looking research addressing the multifaceted challenges of stable, secure and resilient operation for future DER-rich power grids.

Guest Editors

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About the Journal

Message from the Editor-in-Chief

Electronics is a multidisciplinary journal designed to appeal to a diverse audience of research scientists, practitioners, and developers in academia and industry. The journal is devoted to fast publication of latest technological breakthroughs, cutting-edge developments, and timely reviews of current and emerging technologies related to the broad field of electronics. Experimental and theoretical results are published as regular peer-reviewed articles or as articles within Special Issues guestedited by leading experts in selected topics of interest.

Editor-in-Chief

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