



Call for Papers

IEEE Journal of Emerging and Selected Topics in Power Electronics

Special Issue on Modeling, Topology and Control of Grid-Forming Inverters

Scheduled Publication Time: June 2020

Electric grid modernization calls for rapid development of advanced and versatile grid infrastructures. Especially with increasing penetration of inverter interfaced renewable energy sources, modern electric grid is evolving towards a 100% power converter-based system. Conventional grid-connected converters can fulfill some requirements when being integrated into the grid. However, their limited operation scenarios cannot fully satisfy the requirements of future inverter dominated power systems. To diversify the grid interactive functionalities and adapt to converter-based electric grids, power electronic inverters are requested to operate in the grid-forming mode so that grid voltage and frequency can be stabilized without the support from legacy bulk generators. There are thus increasing research efforts made on the realization the grid-forming inverters, e.g. power synchronization control, synthetic inertia, etc. How to resiliently and reliably operate and synchronize grid-forming inverters under different grid dynamic scenarios becomes critical for grid stability. Meanwhile, traditional grid stability analysis majorly focuses on either power electronics or power system perspectives. Comprehensive analysis considering the impacts from both sides should be conducted to better understand the stability issues in modern electric grids.

The Special Section targets the dynamic modeling and control of grid-forming inverters, especially interconnected multiple inverters with grid-forming capabilities that may trigger operational concerns at the large-scale power system levels. Both normal operation (e.g., frequency and voltage regulation, active stabilization, etc.) and fault scenarios (e.g., short-circuit analysis, fault response, etc.) of grid-forming inverters are included within the scope. Large-scale integration of grid-forming inverters towards a 100% power-electronics-based power system is also of interest for this special session. Topics of interest include, but are not limited to:

- Dynamic modeling of grid-forming inverters
- Advanced hardware design of grid-forming inverters
- Synthetic inertia and frequency control of grid-forming inverters
- Supervisory control of multiple grid-forming inverters
- Power quality issues with aggregated grid-forming inverters
- Resiliency enhancement using grid-forming inverters
- Active stabilization of inverter dominated power systems
- Interactions between grid-forming inverters and conventional power generation units
- Control of grid-forming inverters in faulted grids
- Control of grid-forming inverters in unbalanced grid condition
- Updated standards and codes for large-scale integration of grid-forming inverters

All manuscripts must be submitted through Manuscript Central at <http://mc.manuscriptcentral.com/jestpe-ieee>. Submissions must be clearly marked “Grid-forming Power Electronic Converters in Modern Electric Grids, 2019” on the cover page. When uploading your paper, please select your manuscript type “Special Issue.” Manuscripts submitted for the special issue will be reviewed separately and will be handled by the guest editorial board noted below.

Deadline for Submission of Manuscript: June 15, 2019

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Proposed Timeline:

- February 28, 2019 – Call for Papers to IEEE JESTPE Editorial Office
- June 15, 2019 – Manuscripts Submission Deadline
- February 29, 2020 – Final Acceptance Notification
- April 1, 2020 – Manuscripts Forwarded to IEEE for Publication
- June, 2020 – Special Issue Appears in IEEE JESTPE