Applied Computational Intelligence and Soft Computing

Special Issue on

Application of Computational Intelligence for Smart Electric Power Infrastructures

CALL FOR PAPERS

Over the past decades, the electric power grids, considered as one of the most critical infrastructures, are rapidly changing in many aspects, including expansion in geographical areas, assets additions, and penetration of new generation and management technologies in energy generation, transmission, and distribution. Such modernization makes the electric power system become more complex and vulnerable to cascading failures or outages, which brings urgent challenges on power system design, planning, operation, and control. The optimal planning, control stability, blackouts, cascading failures, cyberphysical attacks, and other management issues have attracted much attention and research effort from cross-discipline to look into this interdisciplinary topic.

The computational intelligence techniques, e.g., artificial neural networks, genetic algorithms, fuzzy logic, and evolutionary computation, are considered a novel and modern tool to address the complex problems. In particular, there exist problems in the power systems that cannot be solved using the conventional approaches which are often based on stringent requirements or assumptions which may not be true all the time. In such cases, computational intelligence techniques can be the viable solutions.

This special issue brings together research questions and approaches originating in different research fields, such as advanced computational intelligence, machine learning, optimization, and statistics. As such, it provides an overview of a broad spectrum of ongoing smart energy system research.

Potential topics include but are not limited to the following:

- System operation forecasting based on computational intelligence techniques (e.g., demand/generation forecasting, state estimation, and market price forecasting)
- Computational intelligence techniques for modeling and analysis of attack actions and attack strategies in power grids
- Machine learning for power grid cyberphysical security/intrusion detection and analysis
- Computational intelligence for multicontingency analysis in power systems
- Performance assessment tools and simulation platforms of computational intelligence solutions
- Computational intelligence based optimal planning or operation of power systems
- The application of computational intelligence in electric power market
- Computational intelligence and machine learning for management and maintenance of large-scale power system infrastructure
- Case studies and field trials of computational intelligence solutions in power systems

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Lead Guest Editor
Qiang Yang, Zhejiang University, Hangzhou, China
qyang@zju.edu.cn

Guest Editors
Nenggan Zheng, Zhejiang University, Hangzhou, China
zng@cs.zju.edu.cn

Wei Li, University of Sydney, Camperdown, Australia
liwei@it.usyd.edu.au

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