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Artificial Intelligence for More Efficient Renewable Energy Systems

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Message from the Guest Editors

The steady integration of renewable energy systems into the utility grid presents novel challenges for future power grids. The intermittent nature of power injection from renewable sources, combined with unpredictable load-side demand and the rising prevalence of electric vehicles, poses significant issues for grid stability and performance. Power electronics-based power conversion systems are pivotal in maintaining grid stability and ensuring seamless operation. They manage power flow between generation and demand, control active and reactive powers injected into the grid, regulate power flow between the grid and EVs through V2G and G2V technologies, and oversee EV motor drives.

To enable these systems to meet their evolving responsibilities, the development of more efficient and high-performance systems based on artificial intelligence (AI) techniques is imperative. These controllers must ensure robust and high-quality power flow control, provide precise tracking performance of the reference current, and be capable of mitigating internal/external disturbances, handling model parametric mismatches, and addressing grid voltage distortion.

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Message from the Editor-in-Chief

Algorithms are the very core of Computer Science. The whole area has been considered from quite different perspectives, having led to the development of many sub-communities: Complexity theory (limitations), approximation or parameterized algorithms (types of problems), geometric algorithms (subject area), metaheuristics, algorithm engineering, medical imaging (applications), indicates the range of perspectives. Our journal welcomes submissions written from any of these perspectives, so that it may become a forum for exchange of ideas between the corresponding scientific subcommunities.

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