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| **Title:** | Study on Criticality Minimizing Cost in Power System with Optimal Design of Stochastic Wind Power Generators using Moth Flow Optimization | | |
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| **Abstract:** |  |
| The power grid, one of the most crucial components of smart cities, faces significant challenges in operating efficiently, dependably, and economically. One of these challenges is forecasting the demand for electricity. Grid managers can balance supply and demand properly while also minimizing operating expenses for generating and transmitting power. Thanks to accurate forecasts, while maintaining respectable system performance in terms of the limitations on the actual and reactive power output of the generator, bus voltages, shunt capacitors and reactors, transformer tap setting, and transmission line power flow. For a sustainable future and to meet the higher carbon emission standards that are being put in place, it is expected that the renewable energy sector will experience enormous development. The placement of wind turbines in a wind farm requires the use of evolutionary algorithms and power system optimization issues because the wake effect caused by upstream turbines impacts the output of downstream turbines, consequently diminishing the total power output from the wind farm. The current study using MFO determines a cost of $ 3160.0824 $/h for minimizing the cost of multiple fuels, which turns out to be the best price when compared to the legitimate results obtained by other algorithms. It results in a cost savings of 1.45% per hour when compared to the worst alternatives given by the comparison algorithm. According to simulation results on the IEEE 30-bus network with six generators, this approach might offer the best solution right away. A further study found that this method works best for medium-scale power installations. | |