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| **Title:** | Moth Flame Optimization Algorithm including Renewable Energy for Minimization of Generation & Emission Costs in Optimal Power Flow | | |
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| **Abstract:** |  |
| **Optimal power flow is an approach for enhancing power system performance, scheduling, and energy management.**  **Because of its adaptability in a variety of settings, optimum power flow is becoming increasingly vital. The demand for optimization is driven by the need for cost-effective, efficient, and optimum solutions. Optimization is useful in a variety of fields, including science, economics, and engineering. This problem must be overcome to achieve the goals while keeping the system stable. Moth Flame Optimization (MFO), a recently developed metaheuristic algorithm, will be used to solve objective functions of the OPF issue for combined cost and emission reduction in IEEE 57-bus systems with thermal and stochastic wind-solar– small hydropower producing systems. According to the data, the**  **MFO generated the best results across all simulated research conditions. MFO, for example, offers a total cost and emission of power generation of 248.4547 $/h for IEEE 57-bus systems, providing a 1.5 percent cost savings per hour above the worst values obtained when comparing approaches. According to the statistics, MFO beats the other algorithms and is a viable solution to the OPF problem.** | |