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.

KEYWORDS: moth flame optimization, combined cost and emission, probability density functions (PDF), renewable energy

AUTHOR CONTRIBUTIONS

Authors 1–2 did the study and drafted the article, while Authors 3–5 examined the data and revised the manuscript for the conference. The final version had been authorized by all authors.

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