Optimal reactive power dispatch solution by loss minimization using moth-flame optimization technique

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ARTICLE INFO

ABSTRACT

In this paper, a newly surfaced nature-inspired optimization technique called moth-flame optimization (MFO) algorithm is utilized to address the optimal reactive power dispatch (ORPD) problem. MFO algorithm is inspired by the natural navigation technique of moths when they travel at night, where they use visible light sources as guidance. In this paper, MFO is realized in ORPD problem to investigate the best combination of control variables including generators voltage, transformers tap setting as well as reactive compensators sizing to achieve minimum total power loss and minimum voltage deviation. Furthermore, the effectiveness of MFO algorithm is compared with other identified optimization techniques on three case studies, namely IEEE 30-bus system, IEEE 57-bus system and IEEE 118-bus system. The statistical analysis of this research illustrated that MFO is able to produce competitive results by yielding lower power loss and lower voltage deviation than the selected techniques from literature.

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