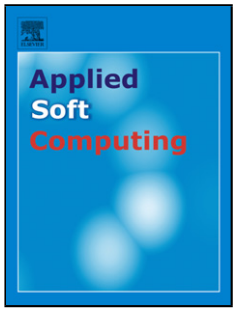

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A novel quasi-oppositional modified Jaya algorithm for multi-objective optimal power flow solution

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Highlights

- A novel meta-heuristic optimization algorithm known as QOMJaya to solve different MOOPF problems is proposed.
- Essential modifications to the basic Jaya algorithm are done (i.e. MJaya).
- The proposed algorithm is scrutinized and validated using the IEEE 30-bus test system.
- The obtained results were compared to those from other heuristic optimization algorithms.
- Simulation results reveal the proposed algorithm's supremacy over many previous algorithms in terms of solution optimality and feasibility.
- The obtained results disclose the proposed algorithm's ability to produce real and well-distributed Pareto optimum fronts.

Abstract

This study introduces a novel meta-heuristic optimization algorithm known as quasi-oppositional modified Jaya (QOMJaya) to solve different multi-objective optimal power flow (MOOPF) problems. An intelligence strategy called quasi-oppositional based learning is incorporated into the proposed algorithm to enhance its convergence property, exploration capability, and solution optimality. Significant modifications to the basic Jaya algorithm are done to create a modified Jaya (MJaya) algorithm that can handle the MOOPF problem. A fuzzy decision-making strategy is proposed and incorporated into the Jaya algorithm as selection criteria for best and worst solutions. A new criterion for comparing updated and current candidate solutions is proposed. The concept of Pareto optimality