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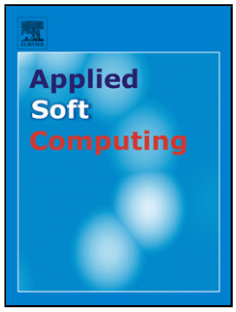

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Hybrid Artificial Algae Algorithm for Economic Load Dispatch

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Highlights

- In this paper, the artificial algae algorithm (AAA) is hybridized with simplex search method (SSM) and a new hybrid algorithm known as hybrid artificial algae algorithm (HAAA) is proposed.
- The parameters of proposed hybrid HAAA are made self-adaptive.
- The performance of developed hybrid HAAA algorithm studied thoroughly on standard CEC'05 function set and five economic load dispatch problems.
- The proposed HAAA algorithm is computationally efficient and robust as compared to basic artificial algae algorithm.
- The equality constraint and prohibited operating zone constraints are handled heuristically.

***Abstract*—**A hybrid artificial algae algorithm (HAAA) has been proposed in this paper that hybridizes the artificial algae algorithm (AAA) and simplex search method (SSM) to solve economic load dispatch problem. The AAA simulates the life cycle of microalgae which comprises helical movement, evolutionary and adaptation phases. The helical movement phase provides the exploration while the evolutionary and adaptation phases provide the exploitation of search space. The exploration provided by the helical movement completely depends upon energy and shear-force parameters. In the proposed algorithm, the AAA acts as global optimizer while SSM provides local search. The SSM improves the exploitation capability by performing a local search. Dynamic tuning of parameters enhances the exploration capability of the proposed method. An iterative heuristic repair algorithm is applied to handle the equality constraint of economic load dispatch problem. Further, the operation in prohibited operating zones is avoided heuristically. The performance of HAAA