

Optimal power flow with stochastic solar power using barnacles mating optimizer

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ABSTRACT

This work proposes the implementation of recent evolutionary metaheuristic algorithm namely, barnacles mating optimizer (BMO) to solve the Optimal Power Flow (OPF) issue. BMO is inspired by the mating behaviour of barnacles which happened in two ways: by normal copulation and sperm-cast. The effectiveness of the proposed BMO in solving the OPF is tested on a modified IEEE-30 bus system that is integrated with solar PV farms for five cases viz (1) cost minimization of the power generation that consists of thermal and stochastic solar power generations, (2) power loss minimization, (3) voltage deviation minimization, (4) emission minimization and (5) combined cost and emission minimization of power generations. To demonstrate the effectiveness and the veracity of the solution obtained by BMO, several recent algorithms that have been reported in the literature will be utilized and compared intensively. In the end, the simulation results demonstrate that the BMO can be effectively becoming an alternative solution for the OPF issue in general.

KEYWORDS

Barnacles mating algorithm; Cost and emission minimizations; Loss minimization; Metaheuristic algorithms; Optimal power flow

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