

Evolutionary mating algorithm

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ABSTRACT

This paper proposes a new evolutionary algorithm namely Evolutionary Mating Algorithm (EMA) to solve constrained optimization problems. The algorithm is based on the adoption of random mating concept from Hardy–Weinberg equilibrium and crossover index in order to produce new offspring. In this algorithm, effect of the environmental factor (i.e. the presence of predator) has also been considered and treated as an exploratory mechanism. The EMA is initially tested on the 23 benchmark functions to analyze its effectiveness in finding optimal solutions for different search spaces. It is then applied to Optimal Power Flow (OPF) problems with the incorporation of Flexible AC Transmission Systems (FACTS) devices and stochastic wind power generation. The extensive comparative studies with other algorithms demonstrate that EMA provides better results and can be used in solving real optimization problems from various fields.

KEYWORDS

Evolutionary mating algorithm; FACTS devices; Optimal power flow; Optimization techniques

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