

Fuzzy Multi-Objective Optimal Power Flow Using Genetic Algorithms Applied to Algerian Electrical Network

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Abstract. This paper presents a mathematical model for solving Multi-Objective Optimal Power Flow problem considering uncertainties modeled by fuzzy numbers affecting three objective functions given by total generation cost, total gas emission and voltage profile index. The presented resolution approach is based on Genetic Algorithm (GA), where the parameters of this algorithm are determined and optimized after many tests of execution. A model for analyzing trade-off between profit and security constraint is developed. The probabilities of crossover and mutation optimized for GA parameters, dedicated to the presented approach are used to demonstrate a performance and effectiveness of the algorithm compared to other approaches mentioned in this paper. The mathematic model is applied in the Algerian electrical network for 59-bus test system.

Keywords

Fuzzy logic, gas emission, generation cost, genetic algorithms, optimal power flow, voltage profile index.