Voltage Profile Improvement in Electricity Distribution Networks – A Genetic Algorithm Benchmark Study

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Abstract—Voltage quality is an essential requirement in the operation of electricity distribution systems. At consumer busbars, the deviation from the nominal voltage has specific ranges, prescribed in technical regulations. A widely used voltage correction approach is to use reactive power compensation. Capacitor banks are used for this purpose in highly loaded networks, but their placement and sizing requires optimization. Metaheuristic methods are frequently used for parallel optimization problems, and the Genetic Algorithm (GA) is a very well-known metaheuristic technique. However, the performance of the GA is highly dependent on the settings chosen by the user. This paper investigates the influence of the crossover type used on the results of the GA applied to the problem of voltage profile improvement using reactive power compensation with capacitor banks in electricity distribution networks.

Keywords—electricity distribution networks, voltage profile improvement, capacitor banks, genetic algorithms, crossover.

REFERENCES