Improved genetic algorithm for distribution system performance analysis

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ABSTRACT

The objective of this thesis is to make improvements to a new genetic algorithm used for distribution system performance analysis. First, we introduce a re-numbering scheme that enables the latest direct load flow method to be applied in an automatic process for load flow analysis in system reconfiguration studies. Second, it was discovered that the choice of the two initialization parameters for the genetic process, population size and generation number determine the efficiency of the process in terms of computation time and the repeatability of certain Pareto optimal solutions. This thesis improves the genetic algorithm and direct load flow method for the application to the distribution system reconfiguration (DSR) problem. Two standard IEEE test systems are used for method validation and parametric study of the two parameters determining the repeatability of optimal solutions and computation time for the total reconfiguration process.