Optimal Placement and Sizing of Distributed Generation in Microgrid for Power Loss Reduction and Voltage Profile Improvement

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Abstract : Environmental issues and the ever-increasing in demand of electrical energy make it necessary to have distributed generation (DG) resources in the power system. In this research, in order to realize the goals of reducing losses and improving the voltage profile in a microgrid, the allocation and sizing of DGs have been used. The proposed Genetic Algorithm (GA) is described from the array of artificial intelligence methods for solving the problem. The algorithm is implemented on the IEEE 33 buses network. This study is presented in two scenarios, primarily to illustrate the effect of location and determination of DGs has been done to reduce losses and improve the voltage profile. On the other hand, decisions made with the one-level assumptions of load are not universally accepted for all levels of load. Therefore, in this study, load modelling is performed and the results are presented for multi-levels load state.

Keywords : distributed generation, genetic algorithm, microgrid, load modelling, loss reduction, voltage improvement