

ABSTRACT

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Title : Network Reconfiguration and Placement of Capacitor Bank to Reduce Power Loss Using the Particle Swarm Optimization Method

In distributing electrical energy there are problems that often occur, namely power loss which can affect the quality of the distributed power. The radial network configuration can be replaced with several reconfigurations by switching channels on the radial network. In this study, a metaheuristic algorithm known as a the particle swarm optimization (PSO) algorithm, has been proposed for the solution of the network reconfiguration and capacitor bank placement problems in radial distribution networks, using the IEEE 33-bus network system test case. The objective of this study is to minimize power losses by reconfiguring the network, and installing capacitor banks with optimal locations and capacitor sizes. In this study, the power flow on the network is obtained by analyzing the load flow using the backward forward sweep (BFS) method using MATLAB R2020a software and validated using ETAP 19.0.1 software. The results obtained with this algorithm optimization are very significant, reconfiguring the network by opening channels 7, 9, 14, 32, and 37 reduced power losses by 21.6538 kW. Then continued with the installation of one capacitor bank at bus-30 with a capacity of 745.8508 kVAR, the power loss was reduced by 12.4894 kW. So that in the existing conditions the value of power loss which was originally 74.4218 kW, after reconfiguration and installation of capacitor banks, the power loss became 40.306 kW.

Keywords: Power Loss, BFS, PSO, Reconfiguration, Capacitor Bank.