Using particle swarm optimization algorithm in the distribution system planning

ABSTRACT

Technology advancement, the drive to reduce environmental pollution and energy security concern, have led to an increase in the use of Distributed Generations (DGs). One of the important aspects of the power system is the optimal operation of distribution networks. Therefore, the objective of this paper is to determine the possible solution for optimal operation of distribution networks which takes into account the impact of DG. Since the optimal operation of distribution networks is an optimization problem with discrete and continuous variables, it can be introduced as an integer problem that can be formulated using the metaheuristic approach. This paper utilizes the Particle Swarm Optimization (PSO) algorithm to solve the distribution planning problem with DG. In addition, a case study on IEEE 34 bus system has been carried out to demonstrate the effectiveness of the PSO algorithm with regards to Genetic Algorithm (GA). Results indicate that PSO have better performance over the GA in terms of cost of losses minimization and convergence time. Future work should consider to minimize the overall network cost simultaneously that takes into account the DG investment cost, cost of losses and maintenance cost.

Keyword: Distributed generation; Distribution system planning; Particle swarm optimization; Genetic algorithm