

Optimal allocation and sizing of DG in distribution system using evolutionary programming technique

Abstract

In recent years, distributed generation (DG) installation has shown an increasing growth in the distribution networks around the world due to the raise in promotion towards utilization of renewable energy resources and development of co-generation plants. Recent studies have shown that distributed generation can either help in reducing system losses or causing an increase in their magnitude. The study involves the development of new technique for determining optimal allocation and sizing of the DG in order to minimize the losses and improves the voltage in a distribution level. Sensitivity indices based on voltage stability improvement with respect to change in injected active and reactive power at a load bus were derived and used to identify the suitable location for the distributed generation. In order to determine the optimal output of the distributed generation, an Evolutionary Programming (EP) optimization technique was developed with an objective to minimize the distribution losses while satisfying the voltage constraint in the system. The proposed technique was developed using the MATLAB programming software. The effectiveness of the proposed methodology was verified using IEEE 69-bus distribution system.