

## Distribution System Planning with Distributed Generation and Capacitor Placements

**Authors :** Nattachote Rugthaicharoencheep

**Abstract :** This paper presents a feeder reconfiguration problem in distribution systems. The objective is to minimize the system power loss and to improve bus voltage profile. The optimization problem is subjected to system constraints consisting of load-point voltage limits, radial configuration format, no load-point interruption, and feeder capability limits. A method based on genetic algorithm, a search algorithm based on the mechanics of natural selection and natural genetics, is proposed to determine the optimal pattern of configuration. The developed methodology is demonstrated by a 33-bus radial distribution system with distributed generations and feeder capacitors. The study results show that the optimal on/off patterns of the switches can be identified to give the minimum power loss while respecting all the constraints.

**Keywords :** network reconfiguration, distributed generation capacitor placement, loss reduction, genetic algorithm

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