

# Optimal Reconfiguration and DG Allocation in Active Distribution Networks Using a Probabilistic Approach

*Walid Atef Hafez, Elmetwally Omran, Hossam Eldin Abdallah Talaat, Mina G. Naguib*

## Abstract

This paper proposes a method for the reduction of annual energy loss in distribution networks using simultaneous reconfiguration and allocation of Distributed Generators (DGs). The method considers the DGs intermittency throughout the studied period by using a probabilistic model for renewable based DGs. Hence, the model is used in solving a discrete nonlinear optimization problem to find the optimal sizes and locations of DGs and the optimal configuration of the network. The problem is solved using the discrete Firefly optimization technique and is tested on the IEEE 33-bus system. The test cases are used to investigate the effectiveness of simultaneous reconfiguration and DG allocation as compared to reconfiguration alone, DG allocation alone, and DG allocation after reconfiguration. In addition, the test cases investigate the best scenario for simultaneous reconfiguration and DG allocation based on the season.

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