ABSTRACK

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Title : *Application of Genetic Algorithm for Power Grid Reconfiguration to Optimize Power Loss Reduction*

In the operation of electrical distribution systems, critical aspects such as power losses and reliability are key concerns. One way to reduce power losses is through network reconfiguration. In this study, a genetic algorithm method is used to optimize network reconfiguration to reduce power losses. The genetic algorithm is inspired by Darwin's theory of evolution, which states that organisms with higher fitness are more likely to survive and reproduce, while those with lower fitness are more likely to perish. This research utilizes the Indihiang feeder, with power flow calculations performed using the Backward Forward Sweep (BFS) method in MATLAB R2023a and validated with the ETAP 19.0.1 application. The Backward Forward Sweep (BFS) method is one of the techniques used for power flow calculations. This method begins with the identification of the network structure, followed by the determination of the endpoints on each line through analysis of the inter-bus relationships within the network. The main bus or source bus is then identified by tracing the relationships between buses in the network, allowing the bus sequence to be arranged from the source bus to the terminal buses of the lines.

The network conditions of the Indihiang feeder have an initial power loss value of 552.6 kW with a voltage source from the substation of 20 kV. The Indihiang feeder is then reconfigured using the genetic algorithm method, resulting in a reduction of power losses to 526.9 kW.

Keywords: *Genetic Algorithm, Reconfiguration, BFS, Power Loss*