

Distribution feeder reconfiguration with distributed generation using backward/forward sweep power flow - grey wolf optimizer

Drus, Syed Muhammad Fadli Syed^a; Saad, Norhafidzah Mohd^a; Abas, Mohammad Fadhil^b; Ab-Ghani, Suliana^a; Jaalam, Norazila^a; Ali, Abid

^a Universiti Malaysia Pahang, Faculty of Electrical and Electronics Engineering Technology, Pekan, Pahang, 26600, Malaysia

^b Universiti Malaysia Pahang, Faculty of Electrical and Electronics Engineering Technology, Pahang, Malaysia

^c Universite de Sherbrooke, Institut Interdisciplinaire d'Innovation technologique (3IT), QC, Canada

ABSTRACT

This article presents an effective combination method based on Backward/Forward Sweep Power Flow- Grey Wolf optimizer (BFSPF-GWO) for feeder reconfiguration in a distribution network with the presence of distributed generation (DG). The 33-bus test system by adding five tie line switches is proposed with the objective functions of minimizing total power losses and improving the voltage profiles. The results reveal a reduction in active and reactive power losses at 71.41% and 67.66%, respectively. The optimal sizing of DG and installation location are identified by installing a 2.26 MW DG at bus 29. The magnitudes of voltage profiles and critical buses in the test system have been improved. The proposed BFSPF-GWO algorithm's performance in DG placement and sizing with feeder reconfiguration has been evaluated by comparing the results with Mixed-integer optimization by GA (MIOGA) and Particle Swarm optimization (PSO).

KEYWORDS

Distributed generation; Feeder reconfiguration; Optimal placement & sizing; Power loss minimization; Voltage profile improvement

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