New Reconfiguration Method for Improving Voltage Profile of Distribution Networks

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Abstract

Network reconfiguration aims to minimize network real power loss through rearranging the status of open switches. The consumers of the distribution networks need a better voltage profile for efficient operation of various gadgets. This paper thus attempts to develop a new reconfiguration algorithm with an objective of improving the voltage profile of the distribution network without incurring any additional cost for installation of capacitors and tap-changing transformers. The algorithm uses a nature-inspired biogeography based optimization (BBO) that searches for optimal solution through the migration and mutation operators. Test results on a 33 and 69-node distribution networks reveal the superiority of the developed method.

References


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reconfiguration based loss minimization in distribution systems, Int J Elect Power Energy Syst,

Index Terms

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Keywords

radial distribution networks, network reconfiguration, biogeography based optimization.
Nomenclature BBO biogeography based optimization branch-to-node matrix that
describes the topological structure of the distribution network GA genetic algorithm habitat
suitability index habitat vector of load currents vector of branch
currents equivalent load current at node- maximum number of iterations for
convergence check number of nodes number of branches number of elite
habitats PSO particle swarm optimization habitat modification probability
mutation probability real and reactive power load at node- resistance and
reactance of branch- maximum species count suitability index variable 
binary variable that represents the topological status of -th branch. It equals ‘1’, if the
tie/sectionalizing switch is closed, else its value is set.