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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Index Terms

Computer Science

Wireless

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-n

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-m

resistance and reactance of branch-n

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