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AN OPTIMIZATION APPROACH BASED ON IMPROVED ARTIFICIAL BEE COLONY ALGORITHM FOR LOCATION AND CAPACITY OF GRID-CONNECTED PHOTOVOLTAIC SYSTEMS

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Abstract

Access of photovoltaic system (PVS) to distribution network impacts voltage and power losses and also other related parameters. In order to make full use of the advantages of PVS and determine its optimal location and capacity, an optimal allocation's method for grid-connected PVS is proposed in this paper. This method takes the active power losses minimization as the optimization goal, divides the distribution feeder system into several paths to determine the path priority to install PVS according to active power load moment (APLM). The allowable maximum and minimum active power of grid-connected PVS for each bus are calculated via voltage sensitivity. The improved artificial bee colony (IABC) algorithm that selects initial solution by using path priority and active power restrictions of grid-connected PVS is applied to achieve the optimal allocation of PVSs. This method was examined with IEEE 33-bus feeder system, and the optimal locations and capacities for different numbers of grid-connected PVSs are determined. The results obtained by the proposed IABC algorithm were compared with the results obtained by the artificial bee colony (ABC) algorithm and particle swarm optimization and those attained via other methods. The results show that the proposed method is feasible and

effective. References 11, figures 7. tables 4.

Key words: photovoltaic power, path priority, active power load moment, voltage sensitivity, artificial bee colony algorithm.

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