

Optimal Planning of Wind -based DG Units in Uncertain Distribution Network

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Abstract – This paper presents the Zebra Optimization Algorithm (ZOA), a novel bio-inspired metaheuristic algorithm for optimizing the allocation of distributed generation (DG) units based on wind turbine (WT) technology in distribution networks (DN). The algorithm is based on the foraging and defense strategies of zebras in the wild. ZOA seeks to reduce total energy losses and improve the distribution network's daily voltage profile. The proposed method was applied to a typical IEEE 33-node distribution network, and the simulation results were compared to those obtained by other recently developed optimization algorithms. The comparison report affirmed the efficiency of the Zebra Optimization Algorithm method, demonstrating its ability to outperform existing optimization algorithms.

Keywords – Uncertainties, Wind Turbine(WT), Zebra Optimization Algorithm, Distribution System.

