A Comprehensive Solution for Optimal Capacitor Allocation Problem in Real Distribution Networks

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***Abstract*— The optimal capacitor allocation in electricity distribution networks (EDN) plays a meaningful role in voltage profile improvement, power factor amelioration and also power losses minimization. This work presents two comprehensive optimization algorithms based on metaheuristics as a comparison to solve the capacitor allocation problem in modern distribution networks. Thus, the problem of optimal capacitor allocation for active power losses minimization was solved using the bat and fireworks algorithms. In order to validate and demonstrate the feasibility of the proposed approach, a modern distribution network was tested and the results obtained in MATLAB implementations of the two proposed metaheuristics were compared. The results confirm that the proposed optimization algorithms show a good efficiency and robustness having high performance both for minimizing the EDN power losses and voltage profile improvement.**

***Keywords*—capacitor allocation; metaheuristic; electricity distribution networks; fireworks algorithm; bat algorithm.**

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