Enhancing radial distribution system performance by optimal placement of DSTATCOM

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Abstract

In this paper, A novel modified optimization method was used to find the optimal location and size for placing distribution Static Compensator in the radial distribution test feeder in order to improve its performance by minimizing the total power losses of the test feeder, enhancing the voltage profile and reducing the costs. The modified grey wolf optimization algorithm is used for the first time to solve this kind of optimization problem. An objective function was developed to study the radial distribution system included total power loss of the system and costs due to power loss in system. The proposed method is applied to two different test distribution feeders (33 bus and 69 bus test systems) using different Dstatcom sizes and the acquired results were analyzed and compared to other recent optimization methods applied to the same test feeders to ensure the effectiveness of the used method and its superiority over other recent optimization mehods. The major findings from obtained results that the applied technique found the most minimized total power loss in system, the best improved voltage profile and most reduction in costs due power loss compared to other methods.

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