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Optimal placement and sizing of shunt capacitors in distribution systems using teaching – learning algorithm

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Abstract:

Placement and installation of capacitors in electrical power distribution systems have being done in order to reducing losses , improving voltage profile and realising network lines capacity. In this Thesis , capacitor Placement and sizing of it are reviewed in radial distribution systems to minimizing three objective's functions , system's losses , Compensation costs and Voltage Profile Index and it implemented in the actual system by using teaching and learning Algorithm (TLBO) .This Algorithm based on real class's relationships and including two phases of teacher and student. Also because of the relationships in this algorithm compare to the other algorithm's methods , there are fewer formula and involves less inputs, therefore, the convergence speed is high and the response time is fewer. locate and determine the optimal capacity of the capacitor with respect to the fixed load modle and three objective functions have been studied. This Algorithm has been Implemented on a distributed networks of 22 - 69 – 85 bus and 4 bus distribution network of Nezamieh's Ahvaz relevant to Oil Pipelines and Telecommunication Company of Iran and The results were analyzed by MATLAB simulation.These results represent better situation compare to other technics with 55% reducing of total cost in cost function and 53% reducting of losses in losses function and up to 99% improving in voltage profile index..

Keywords: Placement and installation of capacitors, TLBO Algorithm, Compensation costs, System losses, Voltage Profile Index.