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OPTIMAL PLACEMENT OF TCSC FOR REACTIVE POWER RESERVE MANAGEMENT WITH REACTIVE POWER LOSS MINIMIZATION USING HYBRID PSOGSA

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ABSTRACT

This paper presents a novel heuristic optimization method inspired by law of gravity to reduce the reactive power losses in the system by incorporating series compensating FACTS device, TCSC using a hybrid method based on particle swarm optimization (PSO) and gravitational search algorithm (GSA).This algorithm named as hybrid PSOGSA combines the social thinking feature in PSO with the local search capability of GSA. A power system during disturbances is at a risk of voltage instability due to insufficient reactive power reserve. The optimal placement and parameter setting of multiple TCSCs with proposed algorithm ensures reactive power reserve management which is the suboptimal solution of reactive power loss minimization. Experimental results justify the superiority of the approach over PSO and GSA techniques in terms of its fast convergence, robustness and most significantly its optimal search behavior. The effectiveness of the proposed work is tested for IEEE 30 bus test system. It is observed that the proposed algorithm can be applied to larger systems and do not suffer with computational difficulties.

KEYWORDS: Facts Devices, Hybrid PSOGSA, TCSC, Reactive Power Reserve and Reactive Power Loss

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