

## Optimal Reactive Power Dispatch under Various Contingency Conditions Using Whale Optimization Algorithm

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**Abstract :** The Optimal Reactive Power Dispatch (ORPD) problem has been solved and analysed usually in the normal conditions. However, network collapses appear in contingency conditions. In this paper, ORPD under several contingencies is presented using the proposed method WOA. To ensure viability of the power system in contingency conditions, several critical cases are simulated in order to prevent and prepare the power system to face such situations. The results obtained are carried out in IEEE 30 bus test system for the solution of ORPD problem in which control of bus voltages, tap position of transformers and reactive power sources are involved. Moreover, another method, namely, Particle Swarm Optimization with Time Varying Acceleration Coefficient (PSO-TVAC) has been compared with the proposed technique. Simulation results indicate that the proposed WOA gives remarkable solution in terms of effectiveness in case of outages.

**Keywords :** optimal reactive power dispatch, power system analysis, real power loss minimization, contingency condition, metaheuristic technique, whale optimization algorithm

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