

An Improved Particle Swarm Optimization Technique for Combined Economic and Environmental Power Dispatch Including Valve Point Loading Effects

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Abstract : In recent years, the combined economic and emission power dispatch is one of the main problems of electrical power system. It aims to schedule the power generation of generators in order to minimize cost production and emission of harmful gases caused by fossil-fueled thermal units such as CO, CO₂, NO_x, and SO₂. To solve this complicated multi-objective problem, an improved version of the particle swarm optimization technique that includes non-dominated sorting concept has been proposed. Valve point loading effects and system losses have been considered. The three-unit and ten-unit benchmark systems have been used to show the effectiveness of the suggested optimization technique for solving this kind of nonconvex problem. The simulation results have been compared with those obtained using genetic algorithm based method. Comparison results show that the proposed approach can provide a higher quality solution with better performance.

Keywords : power dispatch, valve point loading effects, multiobjective optimization, Pareto solutions

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