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Ramp Rate and Constriction Factor Based Dual Objective Economic Load Dispatch Using Particle Swarm Optimization

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Abstract : Economic Load Dispatch (ELD) proves to be a vital optimization process in electric power system for allocating generation amongst various units to compute the cost of generation, the cost of emission involving global warming gases like sulphur dioxide, nitrous oxide and carbon monoxide etc. In this dissertation, we emphasize ramp rate constriction factor based particle swarm optimization (RRCPSO) for analyzing various performance objectives, namely cost of generation, cost of emission, and a dual objective function involving both these objectives through the experimental simulated results. A 6-unit 30 bus IEEE test case system has been utilized for simulating the results involving improved weight factor advanced ramp rate limit constraints for optimizing total cost of generation and emission. This method increases the tendency of particles to venture into the solution space to ameliorate their convergence rates. Earlier works through dispersed PSO (DPSO) and constriction factor based PSO (CPSO) give rise to comparatively higher computational time and less good optimal solution at par with current dissertation. This paper deals with ramp rate and constriction factor based well defined ramp rate PSO to compute various objectives namely cost, emission and total objective etc. and compares the result with DPSO and weight improved PSO (WIPSO) techniques illustrating lesser computational time and better optimal solution.

Keywords : economic load dispatch (ELD), constriction factor based particle swarm optimization (CPSO), dispersed particle swarm optimization (DPSO), weight improved particle swarm optimization (WIPSO), ramp rate and constriction factor based particle swarm optimization (RRCPSO)
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