

Abstract

Constrained Economic Dispatch by Combined Genetic and Simulated Annealing Algorithm

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This thesis proposes a combined genetic and simulated annealing algorithm (CGSA) to solve ramp rate constrained economic dispatch (ED) problems for generating units with non-monotonically and monotonically increasing incremental cost (IC) functions. The developed CGSA method is tested on the systems with the number of generating units in the range of 10 to 80 over the entire dispatch periods. As transmission losses are included, the solutions are near the optimal solutions of zoom brute force (ZBF) and zoom dynamic programming (ZDP), and are less expensive than those obtained from simulated annealing (SA), genetic algorithm (GA), GA based on SA solutions (GA-SA) and merit order loading (MOL) methods, thereby leading to substantial generator fuel cost savings. The proposed CGSA is effective in solving constrained ED problem in terms of the quality of solutions.