

Integrating Genetic Algorithms, Tabu Search, And Simulated Annealing

For The Unit Commitment Problem

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Summary

This paper presents a new algorithm based on integrating genetic algorithms, tabu search and simulated annealing methods to solve the unit commitment problem. The core of the proposed algorithm is based on genetic algorithms. Tabu search is used to generate new population members in the reproduction phase of the genetic algorithm. Simulated annealing method is used to accelerate the convergence of the genetic algorithm by applying the simulated annealing test for all the population members. A new implementation of the genetic algorithm is introduced. The genetic algorithm solution is coded as a mix between binary and decimal representation. The fitness function is constructed from the total operating cost of the generating units without penalty terms. In the tabu search part of the proposed algorithm, a simple short-term memory procedure is used to counter the danger of entrapment at a local optimum, and the premature convergence of the genetic algorithm. A simple cooling schedule has been implemented to apply the simulated annealing test in the algorithm. Numerical results showed the superiority of the solutions obtained compared to genetic algorithms, tabu search and simulated annealing methods, and to two exact algorithms.

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