

Hybrid Genetic Approach for Solving Economic Dispatch Problems with Valve-Point Effect

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Abstract : Hybrid genetic algorithm (HGA) is proposed in this paper to determine the economic scheduling of electric power generation over a fixed time period under various system and operational constraints. The proposed technique can outperform conventional genetic algorithms (CGAs) in the sense that HGA make it possible to improve both the quality of the solution and reduce the computing expenses. In contrast, any carefully designed GA is only able to balance the exploration and the exploitation of the search effort, which means that an increase in the accuracy of a solution can only occur at the sacrifice of convergent speed, and vice versa. It is unlikely that both of them can be improved simultaneously. The proposed hybrid scheme is developed in such a way that a simple GA is acting as a base level search, which makes a quick decision to direct the search towards the optimal region, and a local search method (pattern search technique) is next employed to do the fine tuning. The aim of the strategy is to achieve the cost reduction within a reasonable computing time. The effectiveness of the proposed hybrid technique is verified on two real public electricity supply systems with 13 and 40 generator units respectively. The simulation results obtained with the HGA for the two real systems are very encouraging with regard to the computational expenses and the cost reduction of power generation.

Keywords : genetic algorithms, economic dispatch, pattern search

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