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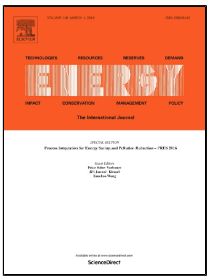

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Improved Harmony Search Algorithm for the Solution of Non-Linear Non-Convex Short-term Hydrothermal Scheduling

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Abstract: The short-term hydrothermal scheduling (SHTS) problem is defined as one of the most important and challenging scheduling problems, which aims to obtain the minimum cost of electrical energy production. Considering an insignificant generation cost of hydropower systems, the objective of STHS is to minimize the operation cost of thermal generation plants. The optimal generation scheduling of hydro and thermal units is a complex non-convex optimization problem taking into account a set of equality and inequality constraints. The challenging constraints of the STHS problem are valve-point loading effect of thermal units, power transmission loss of the system, generation capacity of thermal and hydro units, and load balance. In this paper, an improved harmony search (IHS) optimization algorithm is employed on the non-linear non-convex STHS problem. The proposed method is employed on two test systems in order to evaluate the performance of the applied optimization method on the STHS problem. The simulation results are provided and compared with those reported in recent publications, which proves the effectiveness of the proposed IHS method in the solution of the STHS problem.

Keywords: Harmony search (HS), short-term scheduling, hydrothermal system, non-convex optimization, economic dispatch.

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