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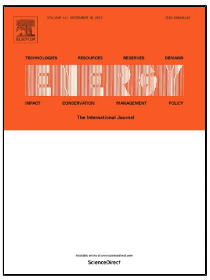

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Profit Based Unit Commitment using Hybrid Optimization Technique

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Abstract: A hybrid optimization technique based on the integration of binary successive approach (BSA) and civilized swarm optimization (CSO) has been proposed to solve profit based unit commitment (PBUC) problem. Since, PBUC is a mixed integer problem, hence to deal with binary and continuous variables, BSA and CSO technique has been employed, respectively. The BSA is based on evolutionary search and search process is initiated with random base point of the hypercube. The each base point further generates two more corner points of the hypercube. The search moves toward the point having better objective function value, and continues until the search has reached to the last branch of BSA tree. This strategy reduces the computational burden while searching the optimal unit status. The generation schedule from the committed unit is searched by CSO technique. The CSO is an integrated technique of PSO and society civilized algorithm (SCA) technique. Since, PSO has good exploration capability and SCA technique is emerging to improve the exploitation capability of the algorithm. Three PBUC test systems have been undertaken and obtained results have been compared with published results and found satisfactory. Further, Wilcoxon signed rank test is applied to investigate statistical performance of the proposed technique.

Keywords: Profit based unit commitment; Binary successive approximation exploratory search technique; Civilized swarm optimization; Ramp rate limits.

1. Introduction