

Optimal Load Control Strategy in the Presence of Stochastically Dependent Renewable Energy Sources

Authors : Mahmoud M. Othman, Almoataz Y. Abdelaziz, Yasser G. Hegazy

Abstract : This paper presents a load control strategy based on modification of the Big Bang Big Crunch optimization method. The proposed strategy aims to determine the optimal load to be controlled and the corresponding time of control in order to minimize the energy purchased from substation. The presented strategy helps the distribution network operator to rely on the renewable energy sources in supplying the system demand. The renewable energy sources used in the presented study are modeled using the diagonal band Copula method and sequential Monte Carlo method in order to accurately consider the multivariate stochastic dependence between wind power, photovoltaic power and the system demand. The proposed algorithms are implemented in MATLAB environment and tested on the IEEE 37-node feeder. Several case studies are done and the subsequent discussions show the effectiveness of the proposed algorithm.

Keywords : big bang big crunch, distributed generation, load control, optimization, planning

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