عنوان مقاله:

An efficient algorithm for Volt/VAr control in distribution systems with distributed generation by a fuzzy optimization approach

محل انتشار:

پنجمین کنفرانس بین المللی مهندسی برق،کامپیوتر و مکانیک (سال: 1399)

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خلاصه مقاله:

This paper presents a multi-objective daily voltage and reactive (Volt/VAr) control in radial distribution systems including distributed generation (DG) units. The main purpose is to determine optimum dispatch schedules for on-load tap changer (OLTC) settings at substations, substation switched capacitors and feeder-switched capacitors based on the day-ahead load forecast. The objectives are selected to minimize the voltage deviation on the secondary bus of the main transformer, total electrical energy losses, the reactive power flow through the OLTC and voltage fluctuations in distribution systems, for the next day. Since the objectives are not the same, a fuzzy system is used to calculate the best solution. In order to simplify the control actions for OLTC at substations, a time-interval based control strategy is used for decomposition a daily load forecast into several sequential load levels. A binary ant colony optimization (BACO) method is used to solve the daily voltage and reactive control which is a non-linear mixed-integer problem. To illustrate the effectiveness of the proposed method, the Volt/VAr control is performed in IEEE 33-bus and 69-bus distribution systems and its performance is compared with genetic algorithm and hybrid binary genetic algorithm and particle swarm optimization algorithms. Simulation results show the BACO algorithm has better outperforms than other algorithms.

کلمات کلیدی:

Distributed generators, Binary ant colony optimization, Fuzzy system, Multi-objective, Reactive power and voltage control

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