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自动化

AVC分散控制模式下的变电站电压无功控制研究

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摘要： 变电站电压无功控制(voltage and reactive power control，VQC)是自动电压控制(automatic voltage control，AVC)系统的重要组成部分。针对传统VQC策略不适应AVC系统且控制效果较差的缺陷，提出了一种新的变电站VQC策略。该策略基于AVC电压目标值、OLTC调节次数和电容器组投切次数构建VQC多目标优化决策模型，对求解模型的可选方案建立目标决策矩阵并进行无量纲处理转化为各目标相对优属度矩阵。为克服单一赋权法的缺点，使权重的确定更为有效合理，综合运用了改进层次分析法(主观赋权法)与离差最大化方法(客观赋权法)以确定各目标的权重值，最后采用多目标决策的线性加权和法求解出最优控制策略。通过算例验证了所提控制策略的可行性和优越性。

关键词： 电压无功控制　自动电压控制　多目标决策　组合赋权

Voltage and Reactive Power Control in Substation Under Decentralized Control Mode of AVC

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Abstract: Voltage and reactive power control (VQC) in substations is an important component of automatic voltage control (AVC). In view of the defects that traditional VQC strategies are not adapted to AVC and their control effects are unsatisfied, in this paper a new VQC strategy for substation is proposed. According to this strategy and based on desired voltage value of AVC, adjusting times of on-load tap changer (OLTC) and switching times of capacitor banks, a multi-objective decision-making model is constructed. For the selectable schemes to solve the proposed model an objective decision matrix is built and through non-dimension treatment the objective decision matrix is changed into relative superior attribute degree matrix of all objectives. To overcome the shortcoming of single weight determination and make the determination of weight more effective and reasonable, the improved analytical hierarchy process (AHP), i.e., the subjective weight determining, and dispersion maximization, i.e., the objective weight determining, are integratively utilized to determine the weight the weights of indices. Finally, the optimal control strategy is solved by multi-objective decision-making based linear weighted sum. The feasibility and superiority of the proposed control strategy are verified by calculation example.

Keywords: automatic voltage control (AVC)　voltage and reactive power control (VQC)　multi-objective decision- making　combination weighing

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