电力系统

基于戴维南等值的静态电压稳定广域切负荷控制策略

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摘要：

针对区域电网难以通过获取外网实时状态信息来实施静态电压稳定控制的问题，提出了一种基于外部网络单点等值，并考虑区域电网静态电压稳定裕度的广域切负荷控制策略。首先采用戴维南等值方法对区域电网的外部系统进行等值。然后以区域电网在负荷增长状态下的潮流等式约束作为静态电压稳定约束条件，建立了全二次最小切负荷优化模型，并采用半光滑牛顿法求解。通过对IEEE 14节点系统的仿真分析，验证了该策略的正确性及有效性。

关键词： 广域切负荷控制　静态电压稳定　戴维南等值　全二次优化模型　半光滑牛顿法

A Wide-Area Load Shedding Strategy Based on Thevenin Equivalence and Considering Static Voltage Stability

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Abstract:

In allusion to the problem that it is difficult for regional power network to implement the strategy to response static voltage stability by acquiring real-time status information of exterior power network, a wide-area load shedding control strategy, which is based on the equivalence of single-bus and considering static voltage stability margin of regional power network, is proposed. Firstly, the exterior system equivalence of regional power network is carried out by Thevenin equivalence; then taking the power flow equality constraint of regional power network under load growth as the constraint of static voltage stability, a complete quadratic optimal load shedding model is built and is solved by semi-smooth Newton method. The correctness and effectiveness of the proposed load shedding strategy are verified by simulation results of IEEE 14-bus system.

Keywords: wide-area load shedding　static voltage stability　Thevenin equivalence complete quadratic optimal model　semi-smooth Newton method

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