

电力系统

基于半张量积方法与准稳态时域仿真的电力系统中长期电压稳定分析

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摘要:

提出了综合基于半张量积方法的非线性动力学稳定裕度指标与准稳态时域仿真的中长期电压稳定判定方法。建立了中长期电压稳定分析模型。该模型将短期动态平衡方程转化为代数方程, 降低了求解稳定裕度指标过程中雅可比矩阵以及海森矩阵的计算复杂度。在此基础上, 利用基于半张量积方法的中长期电压稳定指标分析中长期电压稳定性。新英格兰10机39节点系统的仿真结果验证了所提方法的有效性。

关键词: 中长期电压稳定 半张量积方法 准稳态时域仿真

Analysis of Long- and Medium-Term Power System Voltage Stability Based on Semi-tensor Product and Quasi-Steady-State Time Domain Simulation

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Abstract:

A method to judge medium- and long-term voltage stability, which integrates the non-linear dynamic stability margin index based on semi-tensor product with quasi- steady state (QSS) time domain simulation, is proposed and a medium- and long-term voltage stability analysis model is built. The built model turns the short-term dynamic balance equations into algebraic equations, thus the complexity of computation of Jacobian matrix and Hessian matrix during solving stability margin index can be reduced. On this basis, the medium- and long-term voltage stability index based on semi-tensor product is used to analyze medium- and long-term voltage stability. The effectiveness of the proposed method is verified by simulation results of New England 10-machine 39-bus system.

Keywords: medium- and long-term voltage stability semi-tensor product quasi-steady-state (QSS) time domain simulation

收稿日期 2010-08-27 修回日期 2010-10-27 网络版发布日期 2011-06-16

DOI:

基金项目:

国家自然科学基金项目(50977047)。

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