

电力系统

基于特征值灵敏度的负荷模型对系统阻尼影响的分析方法

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摘要:

低频振荡对电力系统影响危害极大, 负荷是电力系统的重要组成部分, 因此分析负荷模型对系统阻尼的影响具有重要意义。提出了运用特征值灵敏度分析负荷模型对于系统阻尼影响的方法: 基于系统特征值对于模型参数的灵敏度解析式, 推导出阻尼比和振荡频率对模型参数的灵敏度解析式。此方法避开了运用阻尼转矩法分析多机系统阻尼这一难题, 并可把负荷模型对系统阻尼的影响定位在具体的参数上, 解决了负荷模型如何影响系统阻尼这一问题。通过分析2区域4机算例系统中综合负荷模型对系统阻尼的影响, 验证了所提方法的有效性。

关键词: 负荷模型 特征值 阻尼分析 灵敏度计算

An Eigenvalue Sensitivity-Based Method to Analyze Effects of Load Model on System Damping

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Abstract:

Low frequency oscillation is extremely harmful to power system security. Load is an important constituent of power system, thus it is significant to analyze the effect on load model on system damping. A method of analyzing the effect of load model on system damping by eigenvalue sensitivity is proposed. Based on the analytical sensitivity expression of system eigenvalue to load model parameters, the analytical sensitivity expression of damping ration and oscillation frequency on load model parameters is deduced. The difficulty of analyzing the damping of multi-machine system by damping torque method can be avoided by the proposed method, and in this way the effect of load model on system damping can be focused to specific parameters, thus the problem that how load model influences system damping is solved. The effectiveness of the proposed method is verified by analysis results of the effect of synthetical load model on system damping in typical two-area four-machine system.

Keywords: load model eigenvalue damping analysis sensitivity calculation

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