电力系统

交直流互联系统动态电压稳定的分岔值分析

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摘要：

采用分岔理论分析交直流系统的动态电压稳定性。首先给出了交直流系统的一类详细微分代数模型，采用改进连续法构造分岔检测函数计算系统的分岔值。对考虑发电机励磁极限时系统发生极限诱导分岔的情况进行了详细的探讨。以基于Walve负荷模型的IEEE 9节点交直流系统为算例，验证了算法的有效性。在此基础上，分析了交直流模型中的主要参数及直流控制方式对分岔值的影响。最后探讨了低压限流环节(voltage dependent current order limiter，VDCOL)对系统稳定性的影响。仿真结果表明：计及VDCOL后，系统状态矩阵一对共轭特征根发生跳变，导致系统振荡失稳。

关键词：

Bifurcation Analysis of Voltage Stability in AC/DC System

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Abstract:

The voltage stability of AC/DC interconnected power system is analyzed by bifurcation theory. Firstly, a detailed differential algebraic model of AC/DC power system is given and the bifurcation value of the system is calculated by bifurcation test function that is constructed by improved continuation method. The condition that the limit induced bifurcation occurs in the system is researched in detail while the limit of generator excitation is taken into account. Taking the IEEE 9-bus AC/DC system with Walve aggregated load mode as calculation example, the impacts of main parameters in the model of AC/DC system and DC control modes on bifurcation value are analyzed. Finally, the impact of VDCOL on system stability is discussed. Simulation results show that taking voltage dependent current order limiter (VDCOL) into account a pair of the conjugate eigenvalues jump from right plane to left plane and it leads to oscillation instability of the AC/DC system.

Keywords:

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