

电力系统

实用高压直流输电稳态模型及潮流算法解析

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摘要:

交直流混合输电系统的潮流计算是静态安全分析以及暂态稳定、电压稳定、小干扰特征值等分析计算的前提和基础。深入解析和理解电力系统广泛应用的商业计算软件中高压直流输电系统的数学模型、混合系统潮流求解算法, 并掌握影响收敛性的相关因素, 对提高大电网分析人员的计算效率具有重要意义。首先推导了国内广泛应用的BPA潮流计算软件中, 双端高压直流输电系统的准稳态模型; 解析了交直流潮流交替求解算法流程; 通过对一双端高压直流输电系统的潮流解轨迹的计算和分析, 揭示了交直流系统的相互影响特性; 总结了决定特高压直流运行状态和交直流潮流收敛特性的影响因素。

关键词:

Analysis on Practicable Steady State Model of HVDC Power Transmission and Corresponding Power Flow Algorithm

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Abstract:

Power flow calculation of AC/DC hybrid power transmission system is the presupposition and foundation for such analysis and calculations as static security analysis, transient stability, voltage stability and eigenvalue of small signal stability. It is undoubtedly crucial for improving the computational efficiency of personnel engaging large-scale power grid analysis to analyze and understand the mathematical models of HVDC power transmission system and the algorithm to solve power flow of hybrid power system in widely utilized commercial computation software in depth and to master the factors influence convergence property. In this paper, the quasi-steady state model of two-terminal UHVDC power transmission system integrated in BPA power flow computation software that is being widely utilized in China is deduced; the procedure of the algorithm that alternatively solves AC and DC power flow is analyzed; through the computation and analysis on the trajectory of power flow solution of a two-terminal UHVDC power transmission system, the interacting characteristic of AC/DC hybrid power system is revealed; and the factors influencing operation conditions of UHVDC power transmission system and convergence characteristics of AC and DC power flow are analyzed and summarized.

Keywords:

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