

电力系统

含VSC-HVDC的交直流混合发输电系统可靠性评估

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摘要

建立了含柔性直流输电(voltage source converter based high voltage direct current, VSC-HVDC)的交直流混合发输电系统的可靠性分析模型, 该模型既考虑了VSC-HVDC的稳态功率特性, 还计及了发输电网络的故障率和输电线路的有功限制, 采用非序贯蒙特卡罗仿真实现; 在满足系统安全约束的前提下, 对系统进行模拟调度, 重点评价了与发输电网络连接VSC-HVDC对电网可靠性的影响, 给出系统和节点的风险指标, 为VSC-HVDC规划和运行提供参考依据, 最后算例分析证明了该算法的可行性和合理性。

关键词 [柔性直流输电系统](#) [混合发输电系统](#) [可靠性](#) [蒙特卡罗仿真](#)

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Reliability Assessment of Hybrid AC/DC Power System Containing VSC-HVDC

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Abstract

A reliability analysis model for hybrid AC/DC power system containing voltage source converter based high voltage direct current (VSC-HVDC) is built. In the proposed model, both steady state power characteristic of VSC-HVDC and failure rate and capability constrains of transmission network are considered, and the algorithm for this model is implemented by nonsequential Monte Carlo simulation. Under the precondition of satisfying the constraints of system security, the simulation dispatching of the hybrid AC/DC power system containing VSC-HVDC is carried out, and the impact of VSC-HVDC connected with power system on power network reliability is emphatically assessed; the risk indices of power system and nodes are given to offer reference basis for the planning and operation of VSC-HVDC. The feasibility and reasonableness of the proposed algorithm are proved by case study.

Key words [voltage source converter based high voltage direct current \(VSC-HVDC\)](#) [hybrid AC/DC power system](#) [reliability](#) [Monte Carlo simulation](#)

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