

输配电及供电

## 双馈入直流输电系统中VSC-HVDC的控制策略

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摘要

针对多馈入直流输电(multi-infeed direct current, MIDC)系统的稳定性问题, 提出将基于电压源换流器的高压直流输电(voltage source converter based HVDC, VSC-HVDC)引入到MIDC系统中, 用以改善MIDC系统公共连接母线的电压特性。建立HVDC和VSC-HVDC双馈入系统的物理模型, 导出相应的数学模型。并通过坐标变换得出VSC功率传输方程的直角坐标形式。采用多变量非线性控制的逆系统方法, 设计VSC-HVDC系统的非线性控制器。PSCAD/EMTDC 环境下的仿真实验表明, 所设计的VSC-HVDC非线性控制器不仅能有效改善VSC-HVDC的动态特性, 而且在交流系统发生扰动时能有效稳定系统电压, 减少HVDC逆变站发生换相失败的几率, 提高HVDC系统的运行可靠性。

关键词 [高压直流输电](#) [电压源换流器型高压直流输电](#) [多馈入直流输电系统](#) [换相失败](#)

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## Control Strategy of VSC-HVDC in Dual-infeed HVDC Systems

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Abstract

Aim at the stability problem of multi-infeed direct current(MIDC) systems, voltage source converter based HVDC (VSC-HVDC) was applied to MIDC systems for improving the voltage characteristic of common AC bus in MIDC systems. A physical model of a dual-infeed HVDC and VSC-HVDC system was set up, and its mathematical model was developed. The rectangular coordinate form of VSC's power transmission equations was deduced through coordinate conversion. Based on the inverse system method for multivariable nonlinear control, the nonlinear controllers of VSC-HVDC system were designed. Simulation results performed on PSCAD/EMTDC show that the designed nonlinear controllers of VSC-HVDC can improve effectively the dynamic character of VSC-HVDC system, stabilize effectively the voltage of dual-infeed HVDC and VSC-HVDC system when AC side is disturbed, reduce the probability of commutation failure in the inverter of HVDC systems, and increase the operation reliability of HVDC systems.

Key words [HVDC](#) [voltage source converter based HVDC](#) [multi-infeed direct current system](#) [commutation failure](#)

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