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多端直流输电系统中的直流功率调制技术

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摘要
与常规的双端直流输电系统相比，基于直流功率调制技术的多端直流输电系统能更灵活地向所连接的交流系统提供快速的紧急功率支持，改善交流系统的稳定性。文章对其中一端为弱交流系统的4端直流输电系统运用PSCAD/ EMTDC仿真软件研究了多端直流输电系统的功率调制技术，提出了该系统的仿真模型及其复合控制策略。仿真结果表明，所连接交流系统的强度、各换流站的控制策略和直流系统电流平衡原则的选取会极大地影响直流功率调制的性能，多端直流输电系统比常规的双端直流输电系统能更灵活地运用直流功率调制技术，进而有效地提高所连接交流系统的稳定性。

关键词 多端直流输电(MTDC)；多馈入直流输电；直流功率调制；电流平衡控制器

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DC Power Modulation in Multi-Terminal HVDC Transmission System

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Abstract
The DC power modulation based multi-terminal HVDC (MTDC) transmission system can provide fast emergency power support to interconnected AC power grid more flexibly than conventional two terminal HVDC power transmission system and improve the stability of AC power gird. Taking a four-ended HVDC system for example in which one end is connected to a weak AC system, by means of simulation software PSCAD/MTDC, the simulation model and corresponding control strategy are built, in addition, the power modulation technique for MTDC is researched. Simulation results show that the intensity of interconnected AC systems, control strategies of all converter stations and the selection of current balance principle for HVDC system will greatly affect the performance of DC power modulation; MTDC system can apply DC power modulation technique more flexibly than conventional two terminal HVDC system, and then the stability of the interconnected AC systems can be effectively improved.

Key words multi-terminal HVDC (MTDC)；multi-feed high voltage direct current；DC power modulation；current balance controller

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