

电力系统

基于多级注入式电流源变换器的STATCOM建模与控制

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摘要:

介绍一种新型的多级注入式电流源变换器, 这种变换器主桥实现了零电流切换, 消除开关损耗的同时降低了对吸收回路的要求, 简化了变换器与交流系统的连接, 在换向期间网侧不需要大容量的交流电容。建立了基于多级注入式电流源变换器的STATCOM的数学模型, 对STATCOM的非线性数学模型进行局部线性化。通过分析给出了控制策略框图, 利用PSCAD/EMTDC对所建模型进行仿真, 结果表明, 该结构的STATCOM具有良好的动态、稳态特性, 并验证了所提出控制策略的可行性。

关键词: 多级注入 电流源变换器(CSC) 线性化模型 静止同步补偿器(STATCOM)

Modeling and Control of STATCOM Based on Multi-Level Reinjection Current Source Converter

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Abstract:

A novel multi-level current reinjection current source converter (MLCR-CSC) is proposed. The proposed MLCR-CSC implements the zero-current switching, which can not only eliminate the switching losses, but also simplify the requirement of the absorbing circuit and the connection of the converter with AC system is simplified and high-capacity AC capacitor at network side during the commutation isn't needed. The mathematical model of static synchronous compensator (STATCOM) based on the proposed MLCR-CSC is built, and the nonlinear model of STATCOM is locally linearized. After the analysis, the framework of control strategy is given and by use of PSCAD/EMTDC the built model is simulated. The feasibility of the proposed control strategy is verified by simulation, and simulation results show that the STATCOM based on the proposed MLCR-CSC possesses good dynamic and steady state characteristics.

Keywords: multi-level reinjection current source converter (CSC) linear model static synchronous compensator (STATCOM)

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