

新能源与分布式发电

含模块化多电平变流器的分布式发电系统动态特性分析

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摘要:

根据模块化多电平变流器(modular multilevel converters, MMC)的工作原理和拓扑结构特点以及逆变型分布式发电系统(distributed generation, DG)的运行特点,建立了由MMC构成的DG等值系统及其交流电流控制器数学模型。运用PSCAD分析了基于MMC的DG系统动态特性,发现当直流电压大幅波动时,DG交流电流和输出功率同样出现了大幅波动的情况。针对这一问题,提出了改进的交流电流控制器,并通过仿真证明了该控制器的有效性。

关键词: 逆变型分布式发电系统 模块化多电平变流器 交流电流控制器 直流电压波动

Dynamic Characteristic Analysis of Distributed Generation System Based on Modular Multilevel Converters

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Abstract:

According to the working principle and topological structure of modular multilevel converter (MMC) and considering the operational feature of distributed generation (DG) system, an equivalent inversion-type of DG system based on MMC and the mathematical model of its AC current controller are built. The dynamic characteristic of inversion-type of DG system is analyzed by PSCAD and it is found that under DC voltage fluctuation over wide range the AC current of inversion-type of DG system based on MMC and its output power fluctuate over wide range as well. To solve this problem, an improved AC current controller is proposed and whose effectiveness are verified by simulation results.

Keywords: inversion-type of distributed generation (DG) modular multilevel converters AC current controller DC voltage fluctuation

收稿日期 2010-12-10 修回日期 2011-04-12 网络版发布日期 2011-07-11

DOI:

基金项目:

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