

电力电子与电力传动

大功率直驱风电系统高效率变流器设计

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摘要: 在兆瓦级直驱风电系统中, 发电机定子电压等级通常采用较低的690V, 而定子电流等级则很高, 给全功率变流器的设计和制造造成了困难, 特别是效率问题比较突出。提出一种基于直驱多相永磁同步发电机和三电平混合式变流器的技术方案, 用以替代传统的三相发电机和两电平变流器并联方案, 具有更好的谐波性能和效率。讨论不同变流器拓扑在方案中的应用及其参数设计方法, 并在谐波、效率和成本方面进行了比较。

关键词: 驱风力机 全功率变流器 三电平变流器

Design of High-efficiency Converters for Large Direct-drive Wind Turbines

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Abstract: The stator voltage of generator is usually 690V for large MW direct-drive wind turbine so that the current rating is very high. As a result, the full-size converters are difficult to be designed and manufactured, moreover, the efficiency problem is considerable. This paper proposed a solution based on the multiphase permanent magnet synchronous generator (MPPMSG) with hybrid three-level full-size converters, which is thought as an alternative for the traditional three-phase PMSG with the shunted two-level converters and expected to offer better harmonic properties and efficiency. The paper discussed the parameter design of the different converters used in the proposed system. And the harmonics, efficiency and costs were compared with the traditional two-level system.

Keywords: direct-drive wind turbine full-size converter three-level converter

收稿日期 2009-12-14 修回日期 2010-05-10 网络版发布日期 2010-10-29

DOI:

基金项目:

台达电力电子科教发展计划资助。

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