

新能源与分布式发电

电网电压跌落时风机变流器功率平衡控制策略

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摘要:

风机变流器是风电机组实现低电压穿越的关键部件, 其控制性能的提升有利于提高风电机组的低电压穿越能力。基于变流器功率平衡控制思想, 提出了网侧变流器改进型负载前馈控制策略, 提升了网侧变流器的稳压与能量转移能力, 缓和了电网故障期间的系统能量失衡, 改善了风机变流器及风电机组的低电压穿越能力。控制系统的小信号模型分析结果表明, 上述控制策略的稳压与能量转移能力优于传统控制策略。永磁同步风力发电机组系统仿真进一步证明了上述理论分析的正确性。

关键词: 电压跌落 低电压穿越 风机变流器 功率平衡控制 负载前馈控制 网侧变流器

Power Balance Control of Wind Turbine Converter Under Voltage Sag in Power Grid

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Abstract:

Wind turbine converter (WTC) is a key component of wind turbine generation system (WTGS) to implement low voltage ride through (LVRT), so the improvement of its control performance is favorable to enhance LVRT ability of WTGS. Based on the thinking of power balance control of converter, an improved load feed-forward control strategy for grid-side converter is proposed to enhance voltage stabilization and energy transfer ability of grid-side converter as well as to mitigate the energy unbalance of power grid during voltage sag and improve LVRT ability of WTC and WTGS. Analysis results of small-signal model for control system show that the ability of voltage stabilization and energy transfer of the proposed control strategy is better than traditional control strategy. The correctness of above- mentioned theoretical analysis is proved by simulation results of direct-drive permanent magnet synchronous wind power system.

Keywords: voltage drop low voltage ride through wind turbine converter power balance control load feed forward control grid-side converter

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