

新能源与分布式发电

变速恒频风力发电机空载并网控制策略

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摘要:

将磁场定向的矢量控制技术应用到双馈风力发电机并网控制中, 建立了交流励磁变速恒频风力发电机空载并网控制策略, 实现了转子侧电流与磁链的解耦控制。为了说明该控制策略的有效性, 用Matlab/Simnlink建立了空载并网仿真模型, 进行了仿真分析, 并在11 kW双馈风力发电系统平台上进行实验验证, 仿真分析和实验结果均表明该控制策略能有效控制电机定子电压与电网电压在幅值、频率及相位上保持一致, 可实现大容量风电机组的无冲击并网, 同时也表明空载并网技术是变速恒频风力发电机较理想的并网方式之一。

关键词: 磁场定向 交流励磁 柔性并网 变速恒频 空载风力发电机并网

Control Strategy for Grid-Connection of No-Loaded Variable Speed Constant Frequency Wind Power Generator

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Abstract:

Applying the magnetic field-oriented vector control to grid-connection of doubly fed induction generator, a control strategy for grid-connection of no-loaded variable speed constant frequency (VSCF) wind power generator with AC excitation is established, and the decoupling control of rotor current and rotor flux linkage is implemented to achieve the aim of flexibly grid-connection of no-loaded wind power generator. To prove the effectiveness of the proposed control strategy, a simulation model for grid-connection of no-loaded wind power generator is built by Matlab/Simnlink and related simulations are performed. Besides, the experimental verification of grid-connection of no-loaded wind power generator is carried out on an experimental platform of 11kW DFIG system. Results of both simulations and experiments show that using the proposed control strategy the amplitude, frequency and phase of no-loaded wind power generator can be coincided with those of power grid effectively, thus by use of the proposed control strategy the non-impact grid-connection of high-power wind power generator is achievable, meanwhile it also shows that the proposed grid-connection strategy for grid-connection of no-loaded wind power generator is one of ideal grid-connection modes for VSCF wind power generators.

Keywords: stator flux-oriented AC excitation soft grid connection variable speed constant frequency grid-connection of no-loaded wind power generator

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