新能源与分布式发电

基于非线性控制的永磁风力发电机最大风能跟踪

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摘要：

提出了用于实现永磁风力发电系统最大风能跟踪控制的非线性控制策略。在输入随机风速的条件下，非线性控制器使风力机的实际转速快速跟踪给定参考转速，从而使风力机具有高的风能利用系数和风能捕获效率，并从风中获取最大的风能。在Matlab/Simulink环境下构建了系统模型，仿真运行结果证实了上述分析的正确性。为对仿真结果进行验证，研究了FAST风力机代码，建立了基于FAST代码的永磁风力发电系统仿真模型，所得结果验证了上述控制策略的可行性和有效性。

关键词：　非线性控制　风能捕获　FAST代码　永磁发电机

Maximum Wind Energy Tracking of Permanent Magnet Wind Power Generator Based on Non-Linear Controller

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Abstract:

A non-linear control strategy for maximum wind power point tracking for permanent magnet wind power generation system is proposed. Under the condition of input stochastic wind speed, a non-linear controller makes the actual rotational speed of wind turbine rapidly tracing given reference rotational speed, so the wind turbine can possess higher utilization factor and capture efficiency of wind energy, and the maximum wind energy can be obtained. A wind power generation system model is built in the environment of Matlab/Simulink, and simulation results verify the correctness of above-mentioned theoretical analysis. To validate the simulation results, the FAST wind turbine code is researched and a simulation model for permanent magnet wind power generation system based on FAST code is built, and the feasibility and effectiveness of above-mentioned control strategy are verified by the obtained results.

Keywords: EHV transmission lines　UHV transmission lines　electromagnetic environment limited value standard

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