

## 计及风电场的发输配电系统可靠性评估

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### 摘要

考虑风速时序性和自相关性的特点, 建立了风速的自回归移动平均(auto-regressive and moving average, ARMA)模型, 并结合常规机组、线路和变压器等状态模型, 建立了基于蒙特卡罗仿真方法的风电场可靠性模型, 对含风电场的发输电组合系统进行可靠性评估, 同时建立了发输电组合系统的多状态机组等值模型, 将该等值模型与配电系统相结合, 计算了平均停电频率和停电电量损失等配电网可靠性指标, 通过分析和比较可靠性指标研究了风电场对配电系统可靠性的影响, 结果表明风电机组的接入对提高电力系统可靠性具有一定的作用。

### 关键词

[风电场](#); [配电系统](#); [可靠性评估](#); [序贯蒙特卡罗仿真](#); [多状态机组等值模型](#)

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## Reliability Assessment of Power Generation Transmission and Distribution Systems Containing Wind Farms

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- Abstract

Considering the features of sequentiality and self-correlation of wind speed, an auto-regressive and moving average (ARMA) model for wind speed is built. Combining with the state models of conventional generating units, transmission lines and transformers, a Monte Carlo simulation based wind farm reliability model is established to perform reliability assessment of power generation and transmission system containing wind farm, meanwhile, a multi-state service provider (MSP) model of power generation and transmission system is built; combining the MSP model with distribution system, the reliability indices of distribution network such as average interruption frequency and interruption caused electricity loss are calculated. By means of comparing and analyzing the reliability indices, the impact of wind farm on distribution system is researched and the results show that interconnection of wind farm with power grid can play a certain role in the improvement of power system reliability.

### Key words

[wind farm](#); [distribution system](#); [reliability assessment](#); [sequential Monte Carlo simulation](#); [multi-state service provider model](#)

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