

What is a wind turbine generator failure analysis & fault diagnosis?

In this article, a comprehensive and up-to-date review of wind turbine generators failure analysis and fault diagnosis are presented. First, the electrical and mechanical failures of various WTG components, including stator, rotor, air gap, and bearings, are analyzed. Then, the fault characteristics and root causes of WTG are studied.

Which approach is best for wind turbine generator fault diagnosis?

Finally, the application of four categories of model-based, signal-based, knowledge-based and hybrid approaches to wind turbine generator fault diagnosis is summarized. The comprehensive review shows that the hybrid approach is now the leading and most accurate tool for real-time fault diagnosis for wind turbine generators.

Why is time-frequency analysis important for wind turbine fault diagnosis?

Since the wind turbine is a complex system with variable operating conditions, the actual fault signal often has nonlinear and non-stationary characteristics, so time-frequency analysis is more effective for fault diagnosis of generators and other components.

How to identify wind turbine faults?

Literature proposed a strategy containing wavelet transform, feature analysis, judgment, and back propagation neural network (BPNN) classification (WT-FA-JD-BP) to identify the wind turbine systems' faults. As shown in Figure 16. First, the original voltage signals under different faults are collected.

Why do we need a fault diagnosis for wind turbines?

The development of highly reliable and low-maintenance wind turbines is an urgent demand in order to achieve the low-carbon goals, and the arrival of fault diagnosis provides assurance for its satisfactory operation and maintenance.

Do model-based fault detection and fault-tolerant control schemes improve wind turbine reliability?

The authors in comprehensively review the state-of-the-art model-based fault detection and fault-tolerant control schemes for wind turbine generation, focusing on their advantages, capabilities, and limitations, to provide a suitable reference for further research on wind turbine reliability improvement.

The fast-growing wind power industry faces the challenge of reducing operation and maintenance (O& M) costs for wind power plants. Predictive maintenance is essential to improve wind ...

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Through comprehensive investigation, this paper summarizes the research status of wind turbine fault prediction and complete machine status evaluation, conclusively presenting relevant research points and trends in the ...

It is always a primary challenge in fault diagnosis of a wind turbine generator to extract fault character information under strong noise and nonstationary condition. As a novel ...

The fault diagnosis and prognosis of wind turbine systems represent a challenging issue, thus justifying the research topics developed in this work with application to safety-critical systems. Therefore, this chapter ...

The comprehensive review shows that the hybrid approach is now the leading and most accurate tool for real-time fault diagnosis for wind turbine generators. A qualitative and quantitative ...

The electric generator is estimated to be among the top three contributors to the failure rates and downtime of wind turbines. For this reason, in the general context of increasing interest towards effective wind turbine condition ...

: Fault distance at each node against node number L-L-L fault applied on all plant nodes (22 nodes), the short circuit current at all generators terminal variation from 26426 A to ...

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This fault may lead to wind turbine failure. Therefore, fault detection in induction generator based wind turbines is vital to increase the reliability of wind turbines. In this project, ...

11ABSTRACT: With the development of offshore wind power, the reliability analysis of offshore wind turbines 12 is increasingly significant due to the system complexity and negative impacts ...

With the rapid development and increasing energy production capacity of high-power wind turbines, a corresponding increase in maintenance requirements has been observed. Reducing the failure rate of wind turbines is ...

This thesis focuses on the analysis of fault conditions and investigates effective fault ride-through and protection schemes in the electrical systems of wind farms, for both small-scale land and ...

Therefore, with the wind turbine gearbox as the main object of study, the following studies were carried out: For microscopic local conditions in gearbox gear systems, a ...

Regarding the wavelet transform-based wind turbine bearing fault feature extraction, Inturi et al. made the fault diagnosis of wind turbine gearbox bearings more efficient by integrating a ...

Vibration analysis is an effective tool for the condition monitoring and fault diagnosis of wind turbine drivetrains. It enables the defect location of mechanical subassemblies and health indicator construction for remaining ...

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