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Intelligent control system for wind power generation

Overview

Wind turbine control systems serve as the central intelligence of each turbine, managing functions such as blade pitch, yaw adjustments, energy conversion, and fault detection.What is SMart Wind Technology?

To address these challenges, an intelligent control system that Smart Wind technologies has been proposed. The system utilizes a network of sensors and IoT devices to collect real-time data on wind speed, temperature, humidity, and other relevant parameters. Access to this full-text is provided by EDP Sciences. This content is subject to copyright.

Can a hybrid controller improve the performance of a PMSG-based wind turbine?

In this paper, the proposed WTPGS system is designed in MATLAB/Simulink software where a hybrid controller (ANFIS-PI) is implemented in the machine-side converter (MSC) and grid-side converter (GSC) of a variable speed PMSG-based wind turbine to enhance its performance subjected to wind variations.

Can a permanent magnet synchronous generator be used as a hybrid controller?

This paper introduces a novel hybrid controller designed for a wind turbine power generation system (WTPGS) that utilizes a permanent magnet synchronous generator (PMSG). This hybrid controller combines the adaptability of an adaptive neuro-fuzzy inference system (ANFIS) with the simplicity of a proportional-integral (PI) controller.

Can DFIG-based wind turbines improve transient stability during weak grid faults?

Optimized Design of Demagnetization Control for DFIG-Based Wind Turbines to Enhance Transient Stability During Weak Grid Faults. IEEE Transactions on Power Electronics, 1–5. doi: 10.1109/TPEL.2024.3457528. Chhipa, A. et al. Rajkumar Soni, and Tulika Chakrabarti.

Does a PI controller stabilize the rotor speed of a wind turbine?

In Figure 10, the performance of the wind turbine model’s rotor speed is showcased over time, comparing the performance of both the PI and hybrid controllers. Initially, the PI controller effectively stabilizes the rotor speed within the first 10 seconds of simulation.

What are some examples of intelligent control mechanisms?

They also compared hybrid solar PV and wind turbines. Artificial neural networks, fuzzy inference systems, fuzzy logic, and neuro-fuzzy are examples of intelligent control mechanisms that have been implemented in numerous scientific and technology domains as convincing alternatives to the traditional.

Intelligent control system for wind power generation

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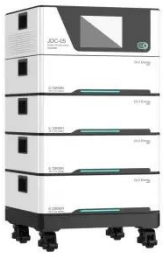

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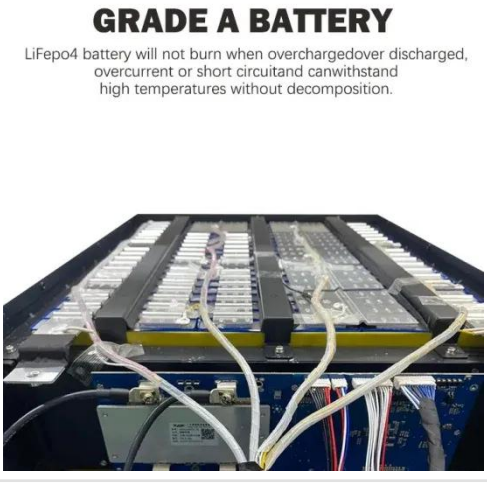

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