European Solar and Energy Storage Solutions

Synchronous permanent magnet generator wind power control

Overview

What is a high-power permanent-magnet synchronous generator (PMSG)?

This paper presents analysis, design, and optimization of a high-power permanent-magnet synchronous generator (PMSG). This generator is introduced in a large-scale wind turbine which can be used in a big wind farm. This generator is used in gearless configuration.

Can hybrid excitation permanent magnet synchronous generator (hpmsg) track wind turbine power?

This paper investigates a novel control strategy that enables hybrid excitation permanent magnet synchronous generator (HPMSG) to track the optimal extracted power of the modern wind turbine type (.

How to choose a wind turbine generator?

Among others is the design of the wind turbine generator. The desired generator should be small and light weight but such design always leads to a tradeoff in the output power aspect , . Permanent Magnet Synchronous Generator (PMSG) and Doubly Fed Induction Generator (DFIG) are most commonly used in wind turbine.

Can a direct-driven PMSG generator be used for offshore wind turbines?

In this study, the generator is designed for 10 MW direct-driven PMSG for offshore wind turbines. Wind speed profile of 4500 points (every ten minutes) was measured in the North Sea during January 2021.

How can a wind turbine be used without a multiplier?

To limit these inconveniences, certain manufacturers developed wind turbines based on synchronous machines with large number of pairs of poles coupled directly with the turbine, avoiding using the multiplier. If the generator is equipped with permanent magnets, the system of rings and brooms is eliminated.

How to reduce the cost of a wind turbine's direct-driven PMSG?

The research focusses on reducing the cost of the wind turbine’s direct-driven PMSG, especially when costly magnets are used. Four different models are constructed, namely structural model, magnetic model, electrical model, and losses model. The objective is set to minimize the mass of the generator, which in turn reduces the cost.

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Design of 20 MW direct-drive permanent magnet synchronous ...

This study introduces a constrained many-objective optimization approach for the optimal design of 20 MW direct drive (DD) permanent magnet synchronous generators (PMSGs). Designing a ...

Modelling and Control of Variable-speed Multi-pole ...

permanent magnet synchronous generator (PMSG) and on their extremely soft drive-train shafts. A model and a control strategy for a full back-to-back converter wind turbine with multi-pole ...

Design and fabrication of an outer rotor permanent magnet synchronous

Permanent magnet synchronous generators (PMSGs) have been widely used in micro-wind turbines (MWTs) for direct-drive applications. IET Control Theory & Applications; ...

Sustainability of the Permanent Magnet Synchronous ...

Today, there are a variety of technologies for wind-generating systems, characterized by component complexity and control. Controllers are essential for the sustainability of the output voltage and the optimal speed of ...

Sustainability of the Permanent Magnet Synchronous ...

In this research, the purpose of this article is to describe and compare the functions of different controllers in a permanent magnet synchronous wind turbine generator. Control methods were used in PMSG wind turbines ...

Design of 20 MW direct-drive permanent magnet synchronous generators

Various topologies for high-power DD generators, such as a permanent magnet (PM) synchronous generator (PMSG), 5, 7 an electrically excited synchronous generator (EESG), 9 ...

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