

Design of wind power generation speed increaser

What type of speed increaser does a wind turbine use?

The speed increasers for WTs can be of fixed-axes [3,14,15] or planetary type [12,16,17,18,19,20,21,22,23,24,25,26,27], the latter being mainly used to produce high kinematic ratios, as is the case with counter-rotation wind systems [23,24].

Can a 1 DOF planetary transmission increase wind turbine speeds?

The performance of a new, patent-pending solution of a 1 DOF planetary transmission is analyzed in this paper, meant to increase the speeds and torques in the counter-rotating wind turbines with counter-rotating electric generator.

What is a wind turbine generator?

As shown in Fig. 1, the wind turbine is a device that converts wind energy into mechanical energy of the main shaft, and the mechanical energy drives the rotor to rotate and finally outputs electrical energy. Wind turbine generator (WTG) is one of the main key components of the wind turbine.

Does a wind rotor have a speed increaser?

To surmount the typical incongruence between the wind rotor, which operates efficiently at relatively low rotational speeds, and the electric generator, which has an optimal functioning at higher speeds, a gearbox has to be used as a speed increaser, so as to provide a compatible connection between the wind rotor and the electric generator.

How does a speed increaser work?

Conventionally, the main input of the speed increaser is connected to the main wind rotor R 1, while the secondary input to the wind rotor R 2; the two outputs are connected to the rotor GR and stator GS of the counter-rotating electric generator.

How does a 1 DOF speed increaser work?

The 1 DOF speed increasers have the properties of summing up the input torques generated by the wind rotors R 1 and R 2, as well as transmitting an independent external motion (in this case, the speed of the main wind rotor R 1) to the other three external links, in a determined way.

The design of the speed increaser for a WT conversion system has to take into account the following requirements: (a) (b) (c) the gearbox should be designed to be installed in a specific ...

As results, we will further describe in Section 2 an appropriate conceptual design algorithm for the development of speed increasers integrated in WTs, proposed by the authors, through a ...

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This estimate explains 22.0%-39.3% of the rapid increase in wind generation CF in China during 2012-2019. The result implies that the site selection of wind farms should ...

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Most wind turbines (WT) are of the single-rotor type, which means they are simple, reliable and durable, but unlikely to convert more than 40% of the available wind energy. Different solutions ...

Aiming to extend the use of type (d) WTs to medium- and large-scale applications, this paper introduces and analyzes a higher-performance WT solution, which integrates two CRWRs, a 1 DOF planetary speed increaser ...

An increase in tip speed ratio leads to a decrease in the mass being lifted and will affect the power output. The maximum power that the turbine could capture depends on turbine design ...

This design approach is developed for involute gears and based on the theory of generalized parameters created by E.B. Vulgakov [1], and it can be defined as an application-driven gear drive development process with ...

The paper deals with the kinematic and static analysis of a novel 1DOF planetary transmission, with two inputs and one output, used as speed increaser in wind/hydro RES, allowing the ...

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