

How to control torsional vibration of wind turbine drive chain?

Liu et al. [35] studied the torsional vibration of the wind turbine drive chain caused by the disturbance wind and the DPC strategy, and an appropriate damping and stiffness compensation control method was proposed to suppress the torsional vibration.

Does wind turbine gearbox have torsional vibrations?

This paper studies the torsional vibrations of wind turbine gearbox having two planetary gear stages and one parallel gear stage. The nonlinear dynamic model developed considers the factors such as time-varying mesh stiffness, damping, static transmission error and gear backlash.

What is torsional vibration suppression problem of wind turbine?

Remark 1: The torsional vibration suppression problem of wind turbine is transformed into the stabilization problem of the tracking error system. The control objective of this article can be formulated as designing a continuous fixed-time control scheme to realize the trajectory tracking of the error system.

What is the torsional vibration dynamic model of a permanent magnet wind turbine?

First, the shaft system of the direct-drive permanent magnet wind turbine is equivalent to a two-mass model. Based on considering the electromechanical coupling and the nonlinear change of the main shaft damping, the torsional vibration dynamic model of the shaft system is established by the Lagrange-Maxwell equation.

Does torsional vibration affect a direct-drive permanent magnet wind turbine?

In order to reduce the hazards caused by the nonlinear torsional vibration of the shaft system of the direct-drive permanent magnet wind turbine, the dynamic characteristics of the controlled shaft system torsional vibration were analyzed. First, the shaft system of the direct-drive permanent magnet wind turbine is equivalent to a two-mass model.

Does damping control reduce torsional vibration caused by wind speed?

Therefore, large-scaled WECS must have damping control. This study found that appropriate enhancing drive chain stiffness could reduce low-frequency torsional vibration caused by wind speed. Therefore, a damping and stiffness compensation control method was proposed to suppress the torsional vibration.

This paper set out to establish the dynamics model of shaft torsional vibration for direct-drive wind turbine with the phenomenon of unstable shaft system torsional vibration. ...

During normal operation Doubly Fed Induction Generator (DFIG) wind turbine drivetrains are exposed to transients in mechanical and electromagnetic torque which excite drivetrain ...

the doubly-fed induction generator (DFIG) has become a mainstream wind turbine (WT) [1]. Due to the harsh environment of the WT and severe impact load, the failure rate of the WT is ...

This paper investigates the reduction of rotor shaft torsional vibrations through active control of the generator torque. A 5 MW turbine model is used to test the procedure. A model of a permanent ...

Due to the fast electric control of the doubly-fed induction generator (DFIG) when experiencing power grid disturbance or turbulent wind, the flexible drive chain of the wind turbine (WT) generates long-term torsional ...

This work illustrates dynamic characteristics and suppression strategy of torsional vibration in wind turbine. This provides a reference for the structural parameters and the electromagnetic parameters optimization design of wind turbine. ...

Torsional vibrations may be a critical issue for those vertical axis wind turbines having long drive trains as compared with standard horizontal axis wind turbines. Such vibrations are studied by ...

The structure of this paper is organized as follows. In Section 2, the dynamic model of wind turbine drivetrain is established. Section 5, torsional vibration analysis of the wind turbine ...

Abstract: This paper presents a method for torsional vibration suppression of the PMSG-based wind turbine using H_∞ observer. Due to the wind speed variation, continuous torsional torque ...

We simulate the model for torsional and lateral vibration using the Runge-Kutta method. Additionally, we set up a test rig of wind turbine generators to simulate actual outer ...

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