

How does a 3 phase asynchronous wind turbine generator work?

Figure 4 shows a full Simulink model of a three-phase asynchronous wind turbine generator. The Basic Turbine block uses a simple output power vs wind speed characteristic to translate wind speed to turbine output power. The machine creates no real power when the wind speed is below the cut-in speed or above the cutout speed.

Why do wind power plants use asynchronous generators?

The use of an asynchronous generator with a short-circuited rotor as part of a wind power plant is due to its high reliability, durability, maintainability and low cost, which directly affects the duration of operation of the autonomous power supply system, the cost of electricity generated and the cost of the wind power plant as a whole.

How much power does an asynchronous generator have?

For an asynchronous generator with a power of 1.1 kW, a synchronous machine with a power of 1.2 kW is adopted, which allows to stabilize the voltage on the stator of the asynchronous generator, when the wind speed changes from 0 to 25 m/s.

How does a synchronous wind turbine work?

With an excess of wind load, the synchronous machine operates in generator mode and accumulates electricity in the batteries, thereby providing additional braking torque on the wind turbine shaft and achieving stabilization of the rotation speed of the rotor of the asynchronous generator, as a result, voltage stabilization at its phases.

What are the parameters of a synchronous wind turbine?

Let us take the following parameters: the radius of the wind turbine is 2.3 meters, the stator current of the asynchronous generator varies from 0.4 to 2.4 amps, the wind speed is 4 m/s, the power of the synchronous machine is 0.4, 0.8 and 1.2 kW.

Why do wind turbines produce more power than fixed speed generators?

In theory, some wind turbine generators may be used to compensate the low power factor caused by neighboring consumers. In economic terms, variable speed wind turbine can produce 8-15% more power than fixed speed counterparts.

Introduction to Doubly-Fed Induction Generator for Wind Power Applications Dr John Fletcher and Jin Yang University of Strathclyde, Glasgow United Kingdom 1. Introduction This chapter ...

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The Simple Turbine block converts wind speed to turbine output power by a simple output power versus wind speed characteristic. When the wind speed is below the cut-in speed or above the cut-out speed, the machine generates ...

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Induction Generator construction is based on the very common squirrel-cage induction motor type machine as they are cheap, reliable, and readily available in a wide range of electrical sizes from fractional horse power machines to multi ...

Introduction Most wind turbines in the world use a so-called three phase asynchronous (cage wound) generator, also called an induction generator to generate alternating current. This type ...

Synchronous Generator Synchronous Generator as a Wind Power Generator. Like the DC generator in the previous tutorial, the operation of a Synchronous Generator is also based on Faraday's law of electromagnetic induction, ...