

# Wind-driven double-fed asynchronous generator

Are adjustable speed generators for wind turbines based on doubly fed induction machines?

Adjustable speed generators for wind turbines based on doubly fed induction machines and 4-quadrant IGBT converters linked to the rotor Proceedings of the 2000 Industry Applications Conference, vol. 4, 8-12 October (2000), pp. 2249 - 2254 A novel control strategy for the rotor side control of a doubly-fed induction machine

Can a double-fed induction generator generate variable speed wind power?

With recent developments in power electronic converters, variable speed generation looks entirely feasible and cost effective. The paper characterizes the performance of a double-fed induction generator (DFIG) for variable speed wind power generation.

How does a doubly fed induction generator drive work?

Vector control of a doubly fed induction generator drive for variable speed wind power generation is described. A wound rotor induction machine with back-to-back three phase power converter bridges between its rotor and the grid forms the electrical system.

What is a doubly fed induction generator (DFIG)?

The doubly fed induction generator (DFIG) system presented in this article offers many advantages to reduce cost and has the potential to be built economically at power levels above 1.5 MW, e.g., for off-shore applications.

Can a doubly fed induction generator be built economically?

The doubly fed induction generator system presented in this article offers many advantages to reduce cost and has the potential to be built economically at power levels above 1.5 MW, e.g., for off-shore applications. A dynamic model of the DFIG was derived to develop a vector controller to decouple dynamically active and reactive power control.

Can a doubly fed generator operate under variable speed operation?

A complete simulation model is developed for the control of the active and reactive powers of the doubly fed generator under variable speed operation. Several studies are performed to test its operation under different wind conditions.

The doubly fed induction generator (DFIG) system presented in this article offers many advantages to reduce cost and has the potential to be built economically at power levels above ...

In this paper, a wind energy conversion system, which consists of a variable speed wind turbine with doubly-fed induction generator (DFIG) fed by a matrix converter is considered. The stator of the wind turbine driven generator is directly connected to the grid, while the rotor is connected via slip-rings to the output of a

matrix converter. The matrix converter is ...

The doubly-fed induction generator (DFIG) is currently the most common type of generator used in wind farms. ... The six-phase generator is driven by a wind turbine with three blades of radius  $R$  ...

In this paper, a wind energy conversion system, which consists of a variable speed wind turbine with doubly-fed induction generator (DFIG) fed by a matrix converter is considered.

Abstract: This paper presents the simulation results of a grid-connected wind driven doubly fed induction machine (DFIM) together with some real machine performance ...

generator connection methods for a 2 MW wind turbine. A simple analysis of the rotor voltage for the doubly-fed connection method is included as this demonstrates the dominant components ...

The doubly fed induction generator (DFIG) system presented in this article offers many advantages to reduce cost and has the potential to be built economically at power levels above 1.5 MW, e.g ...

This paper presents the control strategies and performance analysis of doubly fed induction generator (DFIG) for grid-connected wind energy conversion system (WECS). The wind power produces environmentally sustainable electricity and helps to meet national energy demand as the amounts of non-renewable resources are declining. The development of the ...

This paper presents the simulation results of a grid-connected wind driven doubly fed induction machine (DFIM) together with some real machine performance results. The modeling of the machine considers operating conditions below and above synchronous speed, which are actually achieved by means of a double-sided PWM converter joining the machine ...

This study presents a novel sensorless model predictive control (MPC) strategy of a wind-driven doubly fed induction generator (DFIG) connected to a dc microgrid. In this configuration, the stator is directly connected to the dc ...

Double-fed induction machines can be operated as a generator as well as a motor in both sub-synchronous and super-synchronous speeds, thus giving four possible ...

This study presents a novel sensorless model predictive control (MPC) strategy of a wind-driven doubly fed induction generator (DFIG) connected to a dc microgrid. In this configuration, the stator ...

induction machine is controlled with external rotor resistances, or doubly-fed induction generators are most commonly used by the wind turbine industry (year 2002) for larger wind turbines [2]. ...

A Doubly Fed Induction Generator has a stator winding directly coupled with grid whereas rotor is to the grid via a fault-prone converter. ... L, Rajapakse A, Muthumuni D (2017) Implementation, comparison and application of an average simulation model of a wind turbine driven doubly fed induction generator. *Energies* 10: 1726. Google Scholar. Xu ...

The short-circuit current of double-fed induction generators (DFIGs) are not only the characteristics of the wind turbine generator (WTG) itself but also affected by the control system, especially the status of the rotor overcurrent protection crowbar circuit, which has significant impact on the short-circuit current. First, we introduce the principle of the crowbar protection.

A simple system has been formulated for the operation of wind-driven stand-alone doubly fed induction generators (DFIGs) supplying isolated loads at stator terminals. The stator ...

This book presents a modified model reference adaptive system (MRAS) observer for sensorless vector control of a wind driven doubly fed induction generator (DFIG). A mathematical model of the DFIG ...

According to a wind market survey, the doubly fed induction generator (DFIG) is the most popular generator used in the speed variable wind turbines (SVWT) [5]. It is a wound rotor asynchronous ...

OF DOUBLY FED INDUCTION GENERATOR FOR WIND POWER SYSTEMS. IEEE Press 445 Hoes Lane Piscataway, NJ 08854 IEEE Press Editorial Board Ekram Hossain, Editor in Chief Giancarlo Fortino Andreas Molisch Linda Shafer David Alan Grier Saeid Nahavandi Mohammad Shahidehpour Donald Heirman Ray Perez Sarah Spurgeon

The present paper proposes a model of fuzzy logic control of a doubly fed asynchronous machine (DFAM). First, a mathematical model of DFAM, written in an appropriate d-q reference frame, is established to investigate the results of simulations. In order to control the rotor currents of DFAM, a torque tracking control law is synthesized using PI controllers; the ...

2 Direct torque control of doubly fed induction generator 245 arise by using the dual-DTC approach, higher complexity and an increase in the cost of the system are inevitable.

In the last few decades, there has been a sharp rise in wind power generation worldwide due to the need to reduce the carbon footprint. The doubly fed induction generator (DFIG) is one of the most ...

This study tackles the complex task of integrating wind energy systems into the electric grid, facing challenges such as power oscillations and unreliable energy generation due to fluctuating wind speeds. Focused on wind energy conversion systems, particularly those utilizing double-fed induction generators (DFIGs), the research introduces a novel approach to ...

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Fig. 2.2 Doubly Fed wound rotor induction generator driven by a wind turbine.....11 Fig. 3.1 Configuration of a DFIG driven by a wind turbine connected to a power grid.....22 Fig. 3.2 ...

Advanced Controls for Wind Driven Doubly Fed Induction Generators discusses the most advanced control algorithms used for enhancing the dynamics of a doubly fed induction generator (DFIG) operating at fixed and variable speeds, and which are used for different utilization purposes (standalone and grid connection). Extensive generator ...

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