

Thus, the highest possible level of energy conversion efficiency is required for wind turbines in order to fully use wind power. This paper introduces an overview of AI-based...

In the current era, renewable energy has emerged as a vital alternative to fossil fuels, driven by the repercussions of global warming and the depleting supply of fossil fuels. Among these alternative energies, wind energy is particularly noteworthy due to its minimal greenhouse gas emissions, cost-effectiveness, and widespread availability. Nonetheless, ...

Section 2 revises related work of intelligent control systems for DFIG, Sect. 3 describes the wind turbine operation and the wind turbine model per unit derived for the experimentation, Sect. 4 introduces artificial organic control systems as an ensemble of artificial hydrocarbon networks and fuzzy logic for engineering control systems, Sect. 5 ...

Wind energy conversion systems appear as an attractive alternative for electricity generation. To maximize the use of wind generated electricity when connected to the electric grid, it is ...

This paper proposes an artificial neural network (ANN) based maximum power pointtracking (MPPT) control strategy for wind energy conversion system (WECS) implemented with aDC/DC converter.

In this paper, we examine to control of DC-DC boost converter of a WECS with the help of artificial intelligence (AI)aided PI controller. Regarding the proposed method, artificial neural networks ...

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 ...

Wind energy conversion systems (WECSs) have transformed significantly since artificial neural networks (ANNs), intensively emerged into their applications. This paper presents a relatively ...

In recent years, wind turbines have become an acceptable alternative for electrical energy generation by fossil or nuclear power plants, because of the environmental and economic benefits. Wind energy conversion systems are becoming a reliable competitor of classical power generation systems, which are facing to constantly changing operating ...

Our findings indicate that wind turbine installation using gravity-base foundations had no long-term effects on the occurrence of dolphins or porpoise and may represent an offshore construction ...

This article proposes a switched Z source DC/DC converter based dual stator winding induction generator-based wind-energy-conversion-system (WECS) using an artificial neural network (ANN) maximum ...

Renewable energy forecasting, such as Wind and Solar forecasting, is becoming more critical as the demand for clean energy increases. Thus, it is crucial to enhance the accuracy of wind power predictions to ensure electrical energy system's efficient, reliable, and safe operation. Research on wind forecasting has increased dramatically over the past 10 ...

2.1 Wind turbine The power extracted by a wind turbine is related to the available wind power and the power curve of the machine as expressed by the formula $P = \frac{1}{2} \rho A C_p v_w^3$ (1) where ρ is the air density, r is the radius of turbine blades, v_w is the wind speed and C_p is the power coefficient of the wind turbine as a function of the tip-speed ...

Analysis of Dual Stator Winding Induction Generator-Based Wind Energy Conversion System Using Artificial Neural Network Maximum Power Point Tracking This article proposes a switched Z source DC/DC converter based dual stator winding induction generator-based wind-energy-conversion-system (WECS) using an artificial neural network (ANN) maximum power point ...

5 · New intelligent direct power control of DFIG-based wind conversion system by using machine learning under variations of all operating and compensation modes. Energy Rep. 7, ...

A new maximum power point tracking (MPPT) controller using artificial neural networks (ANN) for variable speed wind energy conversion system (WECS) is proposed.

Due to the complexity of wind turbine systems and the difficulty to predict varying wind speeds, artificial intelligence (AI) and machine learning (ML) algorithms have become key components when ...

Wind energy is an effective and promising renewable energy source to produce electrical energy. Wind energy conversion systems (WECS) have been developing on a wide scale worldwide. The expansion of wind energy demand tends to produce high-quality output power in terms of grid integration. Due to the intermittent nature of wind energy, great challenges are found regarding ...

such as wind speed modelling [11], strategies based on energy price forecasting [12], the study of the interactions between wind energy and the power market [13], wind turbine life cycle analysis [14], etc. This paper shows an exhaustive review of the current techniques and methods concerning these issues

The output power oscillation of a wind turbine heavily depends on the cubic power of wind speed. When this stochastic wind speed changes, the magnitude of oscillation in the output power also varies.

Artificial wind power conversion

Download scientific diagram | Block diagram of the wind energy conversion scheme. from publication: Implementation of Maximum Power Point Tracking Based on Variable Speed Forecasting for Wind ...

The evaluated literature covers a wide range of DFIG-integrated wind energy control system (WECS) strategies, the benefits of which have been emphasised elsewhere (increased effectiveness, power ...

Prediction of power generation of a wind turbine is crucial, which calls for accurate and reliable models. In this work, six different models have been developed based on wind power equation, concept of power curve, response surface methodology (RSM) and artificial neural network (ANN), and the results have been compared. To develop the models based on ...

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 an artificial neural network-based adaptive control approach for a doubly-fed induction generator (DFIG) based wind energy conversion system (WECS). ...

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