

Wind turbine blade direction control

How do you control a wind turbine?

You can control a turbine by controlling the generator speed, blade angle adjustment, and rotation of the entire wind turbine. Blade angle adjustment and turbine rotation are also known as pitch and yaw control, respectively. A visual representation of pitch and yaw adjustment is shown in Figures 5 and 6. Figure 5: Pitch adjustment.

How can a vertical axis turbine be controlled?

Alternative strategies at the turbine level to control the performance of vertical-axis turbines are intracycle control of the turbine's rotational velocity [12,38] or blade pitching [11,25,39]. These two strategies modify the unsteady blade kinematics within one turbine rotation with the goal to control the overall turbine power.

What is pitch control in a wind turbine?

The purpose of pitch control is to maintain the optimum blade angle to achieve certain rotor speeds or power output. You can use pitch adjustment to stall and furl, two methods of pitch control. By stalling a wind turbine, you increase the angle of attack, which causes the flat side of the blade to face further into the wind.

How do wind turbine blades work?

Furling decreases the angle of attack, causing the edge of the blade to face the oncoming wind. Pitch angle adjustment is the most effective way to limit output power by changing aerodynamic force on the blade at high wind speeds. Yaw refers to the rotation of the entire wind turbine in the horizontal axis.

What are the three types of control techniques for wind turbine rotors?

In this paper, state-of-the-art control techniques for wind turbine rotors adopted by researchers are viewed and categorized according to the three types of controllers for WTs: pitch control, yaw control, and torque control.

2. Pitch Control Technique

What are wind turbine control systems?

However, wind turbine control systems are important factors in determining the efficiency and cost-effectiveness of a wind turbine (WT) system for wind applications. As wind turbines become more flexible and larger, it is difficult to develop a control algorithm that guarantees both efficiency and reliability as these are conflicting objectives.

Turbine blade pitch control plays an important role in improving the cost-effectiveness of wind turbines by reducing fatigue loading without compromising power generation (Njiri and Söffker 2016). Turbine blade pitch control ...

Edgewise vibration control of wind turbine blades using roller and liquid dampers View the table of contents for this issue, or go to the journal homepage for more 2014 J. Phys.: ...

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The optimization of wind energy conversion efficiency has been recently boosting the technology improvement and the scientific comprehension of wind turbines. In this context, the yawing behavior of wind turbines has ...

In order to achieve optimal wind turbine performance, pitch control systems and yaw systems are today's state of the art. They constantly adjust the orientation of the nacelle and rotor, as well as the pitch angle of the individual rotor blades, ...

As implied by the name, the blades of HAWTs rotate about the horizontal axis, and they are perpendicular to the direction of wind flow, while the blades of VAWTs rotate ...

1 INTRODUCTION. The increasing size of modern wind turbines is causing increased demands on the wind turbine control system. In addition to the basic wind turbine rotor speed control ...

Turbine blade pitch control plays an important role in improving the cost-effectiveness of wind turbines by reducing fatigue loading without compromising power generation (Njiri and Söffker ...

The two primary aerodynamic forces at work in wind-turbine rotors are lift, which acts perpendicular to the direction of wind flow; and drag, which acts parallel to the direction of wind flow. Turbine blades are shaped a lot like airplane wings - ...

Dongran Song et al. also developed two control systems in order to optimize the power extraction efficiency (PEE) from wind. The first one is a direct measurement-based conventional logic control (control system 1), and ...

