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Advanced control of active and reactive power of DFIG in wind energy conversion system using fuzzy logic type 1

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Abstract:

Wind energy is a type of renewable energy whose primary source is directly drawn from the force of the wind [1, 2]. The most common way to exploit this form of energy is through the use of wind turbines based on several types of electrical machines. Thus, it should be noted that the energy yields and the maximum exploitation of this energy source are dependent on the type of machines as well as the associated controls [3, 4]. We will develop an algorithm based on a fuzzy logic type 1 applied to the wind energy conversion system (WECS) based on a double-fed induction machine (DFIM) driven by a turbine with variable blade pitch and controlled through the rotor variables by two bidirectional converters. The objective of this work is to find a control capable of compensating for the effects of parametric and external disturbances on wind energy conversion systems. The objective of thIS algorithm is to regulate the stator powers of doubly fed induction machines in the WECS. Specifically, the active power must be adjusted based on the reference available mechanical power generated at the turbine, while the reactive power must be kept at zero to ensure a unit power factor on the stator side.

Key word:WECS, DFIG, fuzzy logic type 1, active power, reactive power, turbine

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