

Fuzzy monitoring of stator and rotor winding faults for DFIG used in wind energy conversion system

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Abstract: According to its high robustness, the use of doubly-fed induction generators in the wind energy conversion takes an important place in the world of production of electrical energy. This type of conversion became very attractive because of its manufacturing environments, low cost and operation with an easily available power supply. The increase interest in wind energy conversion has been accompanied by efforts to improve reliability, effective condition monitoring and better efficiency. In this work, a new technique is proposed for monitoring and detection of inter-turn short-circuit ITSC and open phase circuits in the stator or rotor windings of wind turbines based on doubly-fed induction generator. The principle of the suggested technique is based on the acquisition of the stator and the rotor currents of a doubly-fed induction generator with the aim to calculate the values of root mean square amplitude, in addition to the knowledge expressed in rules and membership function. This technique is verified using simulations performed via the model of doubly-fed induction generators built in MATLAB® Simulink.

Keywords : doubly-fed induction generator, DFIG, Fuzzy logic, Monitoring, Detection, faults, RMS