Control Active and Reactive Power of DFIG", Trends in Electrical Engineering (STM Journals), Vol. 5, Issue 1, pp. 1-11, 2015.

Abstract:

The control of active and reactive power of doubly-fed induction generator (DFIG) in a large scale wind farm has become an important issue for the improvement of wind energy system to provide efficient and reliable electrical power with safety. The control strategies of active power and reactive power can be classified in two types—direct power control and indirect power control. First control strategy has designed based on the chosen switching patterns of inverter depending on the error of active power and reactive power with variable switching frequency. The generated ripple of power is high in this case due to the variable switching frequency. Former control strategy has been designed based on the mathematical model of DFIG. In this case the switching frequency can be kept constant. The active power and reactive power controller has been designed based on the PI controller which can be implemented easily by choosing the gains by trial and error method. But, the overshoot and steady-state error cannot be minimized and the controller is not robust under the variation where the gain of PI controller is chosen by trial and error method. In this paper, a discrete-time multi-input and multi-output (MIMO) optimal controller has been designed to control the active and reactive power of DFIG. Moreover, the designed controller is robust under the variation of parameter. The efficacy of the proposed control system has been verified by simulation work which has been done in MATLAB/Simulink software.

Keywords: Doubly-fed induction generator (DFIG), multi-input multi-output (MIMO) controller, field oriented control, robustness