Fuzzy logic control of brushless doubly fed induction generator

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Abstract

This paper presents a new fuzzy logic control algorithm to improve the dynamic performance of the brushless doubly fed induction generator (BDFG). Also, an independent control of the active and reactive power is achieved. The system under study consists of a BDFG driven by a voltage source bi-directional converter. The machine model in d-q power winding (PW) synchronously rotating reference frame is formulated in Matlab/Simulink. Both, the active and reactive control paths are implemented using Fuzzy logic controllers (FLC). Meanwhile each path includes two fuzzy logic controllers, one is used for the outer control loop and the other for the inner control loop. The dynamic performance of the BDFG has been tested when the overall system is subjected to a step change in active and reactive power respectively. The simulation results show that the FLC enhance the dynamic response of the overall system compared with conventional proportional plus integral controller. It achieves also independent control of the active and reactive power with reduced cross coupling effect.