

Performences of Type-2 Fuzzy Logic Control and Neuro-Fuzzy Control Based on DPC for Grid Connected DFIG with Fixed Switching Frequency

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Abstract : In this paper, type-2 fuzzy logic control (T2FLC) and neuro-fuzzy control (NFC) for a doubly fed induction generator (DFIG) based on direct power control (DPC) with a fixed switching frequency is proposed for wind generation application. First, a mathematical model of the doubly-fed induction generator implemented in d-q reference frame is achieved. Then, a DPC algorithm approach for controlling active and reactive power of DFIG via fixed switching frequency is incorporated using PID. The performance of T2FLC and NFC, which is based on the DPC algorithm, are investigated and compared to those obtained from the PID controller. Finally, simulation results demonstrate that the NFC is more robust, superior dynamic performance for wind power generation system applications.

Keywords : doubly fed induction generator (DFIG), direct power control (DPC), neuro-fuzzy control (NFC), maximum power point tracking (MPPT), space vector modulation (SVM), type 2 fuzzy logic control (T2FLC)

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