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Neuro-Fuzzy Based Model Reference Adaptive Control for Induction Motor Drive

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Abstract
An adaptive neuro-fuzzy inference system (ANFIS) based model reference adaptive control (MRAC) approach for vector controlled induction motor drive system is proposed in this paper. Due to the complex and nonlinear construction of induction motors, speed and torque controls are very difficult compared to direct current motors. To improve the speed control system of induction motors, a controller was developed by combining the ANFIS and MRAC structures. The use of the MRAC in the control scheme facilitates the analysis of the adaptive system and provides stability. The ANFIS is used to adaptively compensate for the plant nonlinearities. The adjustable parameters of the controller are updated online. A simulation model for indirect field-oriented control (IFOC) of the induction motor drive is developed using MATLAB/Simulink. The results of the developed controller are compared with the results of the conventional PI type controller to prove the success of the control method. The simulation environment, it is clearly shown that the proposed control structure is considerably successful from the results obtained by operating the induction motor under different conditions.

Keywords: *Induction Motor, ANFIS, MRAC, IFOC.*

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