Direct Torque Control For Induction Motor Using Fuzzy-neural network (FNN).

Summary

In this thesis three approaches are proposed to improve the direct torque control (DTC) of an induction motor (IM) such as fuzzy logic (FL), artificial neural network (ANN) and adaptive neuro-fuzzy inference system (ANFIS) applied in switching select voltage vector. A summary of the theoretical aspects and principles of DTC are given with emphasis on two major pro blems, i.e. high torque and flux ripples and variable switching frequency. In order to sol ve these problems, the proposed control scheme uses the stator flux amplitude and the electromagnetic torque errors through (FL), (ANN) and (ANFIS) to act on both the ampli tude and the angle of the desired reference voltage. Simulation results of three approa ches compared with those of conventional direct torque control (DTC). The comparative results of the direct torque fuzzy controller (DTFC), direct torque neural controller (DTN C) and direct torque neuro-fuzzy controller (DTNFC) illustrate the reduction in the torque and stator flux ripples co mpared with (DTC)& previous related work. The validity of the proposed methods is con firmed by simulative results. The simulation results show an improvement with DNFC co ntroller over the conventional DTC, DTNC and DTFC in both flux and torque responses. The three approaches are explained in clear details , which are designed using SIMULIN K under Matlab /2008 Ver.7.7 software package. Also, MATLAB2008/FUZZY toolbox is us ed to implement the fuzzy logic controller and MATLAB 2008/ANFIS editor graphics user interface which is available in Fuzzy Logic Toolbox to implement the neuro-fuzzy controller. The systems are simulated under the same conditions.

Subject Titles (Not More Than 10)

Adaptive neuro-fuzzy inference system (ANFIS), direct torque control, induction motor, switching table, three phase inverter.