

Abstract

This paper studies a new control structure for sensorless induction machine dedicated to electrical drives using a three-level voltage source inverter (VSI) where the amplitude and the rotating speed of the flux vector can be freely controlled, and both fast torque response and optimal switching logic can be achieved. The selection is based on the value of the stator flux and the torque. We propose two approaches, the first is the new simple method derived from Takahash's strategy in which we divide the dq-plane into 6 regions. In the second approach, we enhance the response of torque and flux with optimal switching strategies. A new DTC scheme of induction motors is proposed in order to develop a suitable dynamic. Direct Torque Control (DTC) uses only a multi-level comparator to perform both torque and flux dynamic control. In addition, to improve the system performance a fuzzy resistance estimator is proposed to solve this common problem in DTC control. Both approaches for DTC controller are simulated for an induction motor. The results obtained indicate superior performance without the need of any mechanical sensor