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Low-Cost Direct Torque Control Algorithm for Induction Motor Without AC Phase Current Sensors

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Abstract :

This paper presents a novel low-cost and simple phase-current reconstruction algorithm for three-phase induction motor (IM) under direct torque control (DTC) using the information obtained from only one shunt resistor (in series with low-side switches in a conventional three-phase inverter). The aim is to develop a low-cost high-performance IM drive. The proposed algorithm is robust and very simple. It uses the dc current to reconstruct the stator currents needed to estimate the motor flux and the electromagnetic torque. A theoretical concept is developed, the modified look-up table is presented, and current-access tables are designed and used in the phase-current reconstruction. The limitations are also studied and presented.

Keywords : Direct torque control (DTC) , induction motor (IM) , sensor count reduction , single current sensor.

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