

Abstract

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Sensorless control of permanent magnet motor based on a simple on line parameter identification scheme

Interior Permanent Magnet Synchronous Motors (IPMSMs) are receiving increased attention for drive applications. To control IPMSM, position and speed sensors are indispensable because the current should be controlled depending on the rotor position. Several sensorless control schemes have been proposed. However, most of these methods use motor parameters to estimate rotor position, and hence position estimation error is caused by parameters variations. That is why, motor parameters are identified on-line under sensorless control. In this paper, an effective and simple on-line parameter identification scheme is proposed to estimate the armature resistance and the q-axis inductance of IPMSMs. The identification method is developed based on the fact that, in practice both the d-axis inductance and the PM flux-linkage are constants. A sensorless control scheme based on the extended EMF using reduced-order observer and the proposed identification method are presented to maintain position estimation accuracy. Simulation results are included to prove the effectiveness of the overall control system under different operating conditions.