

Abstract

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Adaptive control and one-line identification of sensorless permanent magnet DC motor

Permanent Magnet PMDC motors have outstanding performance for use in many modern applications like automated manufacturing systems, automobiles, office machine drives, tools and medical equipment. To control these motors, speed sensors are indispensable. A sensorless control scheme using an observer is proposed. However, this sensorless control method uses motor parameters to estimate speed, and hence estimation error is caused by parameters variations. That is why, an effective and simple on-line parameter identification scheme is proposed to estimate armature resistance and inductance of the motor. The identification method is developed based on the fact that, in practice PM flux-linkage is constant. An adaptive control method is proposed to control PMDC motor speed to maintain speed estimation accuracy. Simulation results are included to prove the effectiveness of the overall control system under different operating conditions.