Abstract

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Observer-based sensorless speed control of PMSM: A focus on drive’s startup

Sensorless Control of permanent magnet synchronous motor has received a lot of research interest due to cost reduction and reliability improvement of the drive. One of the applied techniques is Luenberger observer. However, starting the drive from unknown initial position and from standstill are not sufficiently covered. This paper presents the details of starting the drive from standstill on a fan-type load and roller-type load. The dynamic performance of the drive during homing and open loop acceleration under current control is presented and investigated. The transition from open loop acceleration to observer-based sensorless operation is discussed and the stability of sensorless control against load disturbances is verified discussed. The paper presents simulation results and verifies them experimentally.