

The Unscented Kalman Filter Implementation for the Sensorless Speed Control of a Permanent Magnet Synchronous Motor

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Abstract : This paper addresses the implementation and optimization of an Unscented Kalman Filter (UKF) for the Permanent Magnet Synchronous Motor (PMSM) sensorless control using an ARM Cortex-M3 microcontroller. A various optimization levels based on arithmetic calculation reduction was implemented in ARM Cortex-M3 microcontroller. The execution time of UKF estimator was up to 90 μ s without loss of accuracy. Moreover, simulation studies on the Unscented Kalman filters are carried out using Matlab to explore the usability of the UKF in a sensorless PMSM drive.

Keywords : unscented kalman filter, ARM, PMSM, implementation

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