

A Comparison of Three Stator Resistance Estimation Methods for a Permanent Magnet Motor

Alia R. Strandt, Andrew P. Strandt, Susan C. Schneider, Edwin E. Yaz

Marquette University

1250 W. Wisconsin Ave., Milwaukee, WI, USA

alia.strandt@mu.edu; andrew.strandt@mu.edu; susan.schneider@mu.edu; edwin.yaz@mu.edu

Abstract - In this work, three adaptive estimation methods are considered for the identification of the stator winding resistance of an interior permanent magnet motor. The layout of the magnets in the motor under consideration produces a trapezoidal back electromotive force (emf), which is more challenging for the estimators due to the introduction of higher order harmonics. The three estimation techniques are compared in terms of accuracy in estimating the true parameter value. The multiple model estimation (MME) algorithm utilizing Kalman filters provides the most accurate estimate with the least computational complexity while the additional complexity of the extended Kalman filter (EKF) and the fading memory extended Kalman filter (FM-EKF) results in a poor estimate of the parameter.

Keywords: parameter identification, PM motors, motor-drive systems