

ABSTRACT

Despite model improvements and different control algorithms, much work remains to achieve maximum motor performance. This work attempts to achieve field oriented control and velocity tracking for a step motor using optimization techniques. The resulting performance achieves practical stabilization for velocity tracking of a voltagefed permanent-magnet stepper motor. The control design is an output-feedback design that utilizes stator current and rotor position measurements. The plan is to design a controller that is robust to load torques, cogging forces, and other disturbances satisfying certain bounds by estimating the speed and position of the motor using an extended Kalman filter. We implement the controller and the estimator in a Microchip PIC16F877 microcontroller using embedded technology and achieve speed control using the estimated motor state. We also interface the PIC16F877 to a PC through USART communication to send the real time data to the PC for analysis and comparison with Matlab results.