OPTIMAL SPEED CONTROL METHODS FOR PERMANENT-MAGNET SYNCHRONOUS MOTOR DRIVES

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Abstract. This paper presents the application of linear quadratic regulator (LQR) and linear quadratic Gaussian (LQG). The nonlinear model of permanent magnet synchronous motor (PMSM) has been linearized by two methods (based on field orientation principle and fast power electronic). It is shown that optimal feedback gains and optimal PI can improve speed overshoot and speed settling time. Then it is assumed that system has input and measurements noises and noise effect is reduced by Linear quadratic Gaussian methodology. Computer simulations have been carried out in order to validate the effectiveness of proposed schemes.

Keywords: Linear quadratic regulator (LQR), Linear quadratic Gaussian (LQG), Permanent-magnet synchronous motor (PMSM), Kalman filter, Vector control.