

EVV-based predictive speed control without weight for PMSM

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Abstract

An improved predictive control strategy is proposed to regulate the speed for permanent magnet synchronous motor. Firstly, the motor model is discretized by Taylor series to obtain the expected voltage vector, and a novel cost function is reconstructed with only voltage variables for predictive control, which avoids weight-adjustment. Secondly, the angle of expected voltage vector is obtained by Clark transformation to select the sector, whose voltage vectors are the candidate voltage vectors to reduce calculations. Finally, the optimal voltage vector is determined to switch the inverter by the minimum of the cost function among the candidate voltage vectors. Superior control performance is verified in experiments compared to conventional predictive speed control.

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