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Abstract:

This paper presents sliding mode control (SMC) based speed control of field-oriented induction motor (IM) taking core loss into account. An augmented system, which is derived from the mechanical dynamics of bi drive, is applied to design the sliding mode control. In order to implement the field-oriented method of IM drive, magnetizing q-axis current and rotor speed are chosen as input and output respectively provided that the magnetizing d-axis current is constant. The control input, which has two parts equivalent control input and switching control input, is carried out by using pole placement technique and Lyapunov stability theory. Consequently, the design controller is stable under the variations of load torque and parameters. The performance of the proposed SMC is verified by simulation. Simulation results show that the proposed SMC can provide good responses for desired speed of field-oriented IM even under the variations of load torque and parameters.