Title:	Adaptive Parameters Identification with Bilinear Observer of Induction Motor Taking Core-Loss into Account
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Abstract:

In this paper, an adaptive parameter identification system is designed to estimate the stator resistance, rotor resistance and core-loss resistance of an induction motor (IM) taking core-loss into account. The designed procedure of the identification technique is based on the model reference adaptive system (MRAS) theory. In order to design the MRAS, an adjustable model (AD), which is a mathematical model of IM, should be designed. Since the mathematical expression of an IM behaves like a bilinear system, a bilinear model of IM is considered in AD. A bilinear observer is also designed to estimate the unmeasured state quantities of IM. By means of Lyapunov stability criterion, the gain of bilinear observer and the updating law of parameters can be found by choosing an appropriate reference model. The magnetizing current and rotor flux are estimated from the terminal measured values by using adaptive bilinear observer. The performance of observer and proposed identification technique are verified by simulation results, which are carried out by Matlab/Simulink software. The simulation results are found to have excellent performance for estimation of unmeasured state quantities and changeable parameters of IM taking core loss into account.

Keywords: Bilinear Observer, Adaptive Parameter Identification, Induction Motor, Core-loss, Lyapunov Stability Criterion.

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