

Rotor-speed estimator for induction motors using voltage and current measurements

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Abstract-

This paper presents a rotor-speed estimator for induction motor drives which uses only stator voltage and current measurements. First of all, the identifiability of the rotor speed is analysed in relation to the operating point, giving a good insight into when and why rotor speed can be estimated. Secondly, a computation method is proposed for the rotor speed. Its sensitivity to errors in both model parameters and measurements is discussed in detail. In order to produce effective noise attenuation, a state-variable filter and a recursive total least-squares (TLS) algorithm are used. The estimator is validated by simulation and by field tests.

Index Terms- Induction motor control; identification; sensitivity analysis; filtering; total least squares

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Citation:

Zamora, J.; García-Cerrada, A.; Zazo, A. "Rotor-speed estimator for induction motors using voltage and current measurements", Control Engineering Practice, vol.6, no.3, pp.369-383, March, 1998.