

# FLUX AND SPEED OBSERVERS IN MOTION SENSORLESS DRIVES

**R. Datta, V.T. Ranganathan**

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**Источник:** “A simple position – sensorless algorithm for rotor-side field oriented control of wound rotor induction machine”, IEEE-Trans. Vol. IE – 48, no. 4, 2001, pp. 786-793.

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Sensorless drives are becoming predominant when up to 100 to 1 speed control range is required even in fast torque response applications (1-5 ms for step-rated torque response). There is a rich literature on the subject with quite a few solutions proposed and some are already on the markets worldwide. Essentially they are:

- Without signal injection;
- With signal injection

## **Performance criteria**

To assess the performance of various flux and speed observers for sensorless drives, the following performance criteria have become widely accepted:

- steady-state error;
- torque response quickness;
- low speed behavior (speed range);
- sensitivity to noise and motor parameter detuning;
- dynamic robustness.
- complexity versus performance.

## **A classification of speed observers**

The basic principles used for speed estimation (observation) may be classified as:

- Speed estimators
- Model reference adaptive systems
- Luenberger speed observers
- Kalman filters
- Rotor slot ripple

With the exception of rotor slot ripple, all the other methods imply the presence of flux observers to calculate the motor speed.

### **SELECTED REFERENCES**

1. R. Datta, V.T. Ranganathan, "A simple position – sensorless algorithm for rotor-side field oriented control of wound rotor induction machine", IEEE-Trans. Vol. IE – 48, no. 4, 2001, pp. 786-793.