

## عنوان مقاله:

Robust Backstepping Control of Induction Motor Drives Using Artificial Neural Networks and Sliding Mode Flux Observers

## محل انتشار:

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## خلاصه مقاله:

In this paper, using the three-phase induction motor fifth order model in a stationary twoaxis reference frame with stator current and rotor flux as state variables, a conventional backsteppingcontroller is first designed for speed and rotor flux control of an induction motor drive. Then in orderto make the control system stable and robust against all electromechanical parameter uncertainties aswell as to the unknown load torque disturbance, the backstepping control is combined with artificialneural networks in order to design a robust nonlinear controller. It will be shown that the compositecontroller is capable of compensating the parameters variations and rejecting the external load torquedisturbance. The overall system stability is proved by the Lyapunov theory. It is also shown that themethod of artificial neural network training, guarantees the boundedness of errors and artificial neuralnetwork weights. Furthermore, in order to make the drive system free from flux sensor, a slidingmoderotor flux observer is employed that is also robust to all electrical parameter uncertainties andvariations. Finally, the validity and effectiveness of the proposed controller is verified by computersimulation.

## کلمات کلیدی:

Artificial Neural Network, Backstepping, Induction motor, Observer, robust, Sliding, mode

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