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Ahmad Taher Azar
Quanmin Zhu *Editors*

Advances and Applications in Sliding Mode Control systems

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Contribution to Study Performance of the Induction Motor by Sliding Mode Control and Field Oriented Control

Oukaci Assia, Toufouti Riad and Dib Djalel

Abstract The induction motor squirrel cage that is deemed by its strength, high torque mass, robustness, and its relatively low cost ... etc., meanwhile, it benefited from the support of industry since its invention (invention by Tesla the late nineteenth century). Unfortunately, these advantages are accompanied by a high complexity of the physical interactions between the stator and the rotor. Therefore, dynamic control requires complex control algorithms in contrast to its structural simplicity. In recent decades, many techniques of control of the induction machine, such as technical oriented control or Field Oriented control, have emerged and are currently used to enjoy the benefits of the asynchronous machine for applications where variable speed is essential. The high operating control of the induction machine began with the invention of the oriented vector control in the late 60s flux. Before that time control of the induction machine was limited to scalar commands. This operating control does not provide a decoupling between the flux and torque. To illustrate this, the torque of a cage induction motor has to be increased by increasing the slip, the flux is affected by a decrease; therefore the torque control is dependent of the stream, for this the inherent coupling between these two variables makes conventional techniques less efficient. To solve these problems this paper seeks to analyze dynamical performances and sensitivity to induction motor parameter changes, two techniques are applied Sliding Mode Control and Field Oriented Control. For this, this design on the basis of some simulations results is illustrated with different functions in order to illustrate its efficiency and make comparison between the two techniques; Numerical simulations are presented to validate the proposed methods. The objective of this paper is to

O. Assia
Department of Electrical Engineering, Universty Mentouri of Constantine,
City Rebahi Nouar, 29 street Bouthlidja Tayeb, 41000 Constantine, Algeria
e-mail: assia_oukaci@yahoo.fr

T. Riad
Department of Electrical Engineering, Universty Mouhamed Chrif
Msaadia of Souk Ahras, 41000 Souk Ahras, Algeria
e-mail: toufoutidz@yahoo.fr

D. Djalel (✉)
Laboratory LABGET, Department of Electrical Engineering, Universty of Tebessa,
12000 Tebessa, Algeria
e-mail: dibdjalel@gmail.com

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