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Wide Speed Range V/f with Stabilizing Loops Control of Tooth-Wound IPMSM Drives

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Edited by: Clotea, LR; Cernat, M

PROCEEDINGS OF THE 13TH INTERNATIONAL CONFERENCE ON OPTIMIZATION OF ELECTRICAL AND ELECTRONIC EQUIPMENT, VOLS 1-5

Book Series: Proceedings of the International Conference on Optimization of Electrical and Electronic Equipment

Pages: 424-431

Published: 2012

Conference

Conference: 13th International Conference on Optimization of Electrical and Electronic Equipment

Location: Brasov, ROMANIA

Date: MAY 24-26, 2012

Sponsor(s): Transilvania Univ Brasov, Fac Elect Engr; Univ Politehn Timisoara, Fac Elect Engr; Techn Univ Cluj Napoca, Fac Elect Engr; IEEE; Ind Appl Soc; Power Elect Soc; Ind Elect Soc

Abstract

Novel or modified sensorless control methods, credited with fast dynamic response, better drive efficiency and short computation time are just a few of nowadays main concerns. Therefore, this paper aims to theoretically characterize and digitally investigate through comprehensive Matlab/Simulink simulations three different V/f control strategies, with correction loops. The proposed control methods are all characterized by the missing of the vector current control standard speed and current controllers and they all use the Maximum Torque per Ampere condition (MTPA); coordinate transformations are not necessary. The most important claims of these new control strategies are fast dynamic speed and torque response, low computation effort and the bypassing of initial rotor position problem. To prove the previous claims, a fractionary winding interior permanent magnet synchronous motor (IPMSM) 42Vdc prototype was made and its parameters were previously determined by standstill and load performance laboratory tests. Preliminary test results with proposed method three are available at this point.

Keywords

Author Keywords: sensorless control; V/f control; stabilizing loop; fast dynamic; MTPA; IPMSM

KeyWords Plus: SENSORLESS CONTROL; MOTOR-DRIVES

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Funding

Funding Agency	Grant Number

Citation Network

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strategic grant of the Ministry of Labour, Family and Social Protection, Romania - European Social Fund - Investing in People	POSDRU 6/1.5/S/13
EU-FP7 EE-VERT Project	SCP7-GA-2008-218598- EE-VERT
European Social Fund - Investing in People, within the Sectoral Operational Programme Human Resources Development	POSDRU/89/1.5/S/57649 57649

[View funding text](#)

Publisher

TRANSILVANIA UNIV PRESS-BRASOV, BD EROILOR NR 9, BRASOV, RO-500030, ROMANIA

Categories / Classification

Research Areas: Engineering

Web of Science Categories: Engineering, Electrical & Electronic

Document Information

Document Type: Proceedings Paper

Language: English

Accession Number: WOS:000398866700063

ISSN: 1842-0133

Other Information

IDS Number: BH2ED

Cited References in Web of Science Core Collection: 21

Times Cited in Web of Science Core Collection: 0