AIUB DSpace Publication Details

Title:	Design and Simulation of Discrete Time Optimal Speed Control for an IPMSM Taking Core Loss into Account
Author(s) Name:	Mohammad Abdul Mannan, T. Murata, and J. Tamura
Contact Email(s):	mdmannan@aiub.edu
Published Journal Name:	AIUB JOURNAL OF SCIENCE AND ENGINEERING
Type of Publication:	Journal
Volume:	6 Issue 1
Publisher:	Taylor and Francis
Publication Date:	August, 2007
ISSN:	1608-3679
DOI:	
URL:	https://orp.aiub.edu/ajse-06-01
Other Related Info.:	Page 21-28

Faculty of Engineering

American International University-

Abstract:

In this paper, a discrete time optimal control system synthesis is proposed for speed control of an interior permanent magnet synchronous motor (IPMSM) taking core loss into account. The effects of core loss deteriorate the linearity of torque control. Therefore, we include a current ratio term to design the proposed optimal control. For the vector control system and the loss minimization control system, the ratio of magnetizing d-axis current to q-axis current is not same value. A state space having multi-input and multi-output (MIMO) is developed from which the proposed discrete time linear model is developed. The proposed controller acts like proportional and integral controller by incorporating an augmented system. The integral term eliminates the steady state error of speed. The performance of our proposed controller is demonstrated by simulation studies, which are performed by Matlab. The simulation results show that the accurate speed control is achieved.

Faculty of Engineering

American International University-