

## Author's Accepted Manuscript

Reduced-order observer-based adaptive fuzzy tracking control for chaotic permanent magnet synchronous motors

Jinpeng Yu, Yumei Ma, Haisheng Yu, Chong Lin



PII: S0925-2312(16)30549-5  
DOI: <http://dx.doi.org/10.1016/j.neucom.2016.05.088>  
Reference: NEUCOM17164

To appear in: *Neurocomputing*

Received date: 8 January 2016  
Revised date: 8 April 2016  
Accepted date: 23 May 2016

Cite this article as: Jinpeng Yu, Yumei Ma, Haisheng Yu and Chong Lin, Reduced-order observer-based adaptive fuzzy tracking control for chaotic permanent magnet synchronous motors, *Neurocomputing* <http://dx.doi.org/10.1016/j.neucom.2016.05.088>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting galley proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain

# Reduced-order observer-based adaptive fuzzy tracking control for chaotic permanent magnet synchronous motors

Jinpeng Yu\*, Yumei Ma, Haisheng Yu and Chong Lin

The College of Automation and Electrical Engineering, Qingdao University, Qingdao 266071 P. R. China.

Email of the corresponding author: yjp1109@hotmail.com

## Abstract

This article studies an adaptive fuzzy control method combined with reduced-order observer technology for the position tracking control of chaotic permanent magnet synchronous motor (PMSM) drive system. Fuzzy logic systems (FLSs) are introduced to solve the problem of nonlinear and unknown functions appeared in the PMSM drive system, reduced-order observer is used to calculate its angle speed. Meanwhile, adaptive backstepping mechanism is applied for the design procedure of controllers. The control technique developed in this paper can ensure that the tracking error falls into a small neighborhood of origin. Compared with the existing results, the proposed algorithm can solve the explosion of complexity issue and it does not require measuring the speed signal of motors and the number of adaptive parameters has been reduced to only one. Simulation results show that the chaos of PMSM can be successfully suppressed by the proposed method and the system can track the reference signals very well.

Keywords: Fuzzy approximation; Reduced-order observer; Backstepping; Permanent magnet synchronous motor

## 1 Introduction

Recently, the study of chaotic control has drawn great interests due to its significant value in engineering, physics, mathematics and biology fields. With Ott et al. [1] proposing a control method in chaotic dynamic system in the early 1990s, many techniques have been developed for controlling different chaotic systems including

Download English Version:

<https://daneshyari.com/en/article/4948421>

Download Persian Version:

<https://daneshyari.com/article/4948421>

[Daneshyari.com](https://daneshyari.com)