

# Accepted Manuscript

## Finite-time Consensus for Nonlinear Multi-agent Systems with Time-varying Delay: An Auxiliary System Approach

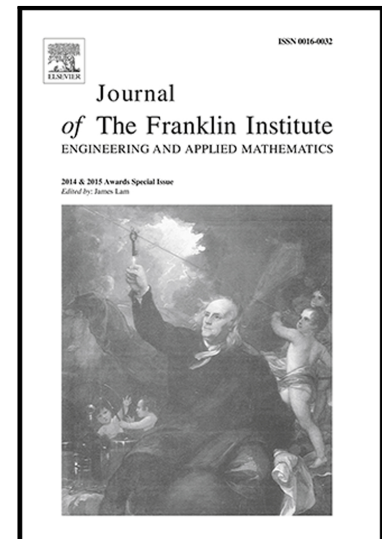
Xiaolei Li, Xiaoyuan Luo, Jiange Wang, Xinping Guan

PII: S0016-0032(17)30604-X  
DOI: [10.1016/j.jfranklin.2017.11.018](https://doi.org/10.1016/j.jfranklin.2017.11.018)  
Reference: FI 3228

To appear in: *Journal of the Franklin Institute*

Received date: 30 March 2017  
Revised date: 9 June 2017  
Accepted date: 11 November 2017

Please cite this article as: Xiaolei Li, Xiaoyuan Luo, Jiange Wang, Xinping Guan, Finite-time Consensus for Nonlinear Multi-agent Systems with Time-varying Delay: An Auxiliary System Approach, *Journal of the Franklin Institute* (2018), doi: [10.1016/j.jfranklin.2017.11.018](https://doi.org/10.1016/j.jfranklin.2017.11.018)



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 proof before it is published in its final 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.

# Finite-time Consensus for Nonlinear Multi-agent Systems with Time-varying Delay: An Auxiliary System Approach

Xiaolei Li<sup>a</sup>, Xiaoyuan Luo<sup>a,\*</sup>, Jiange Wang<sup>a</sup>, Xinpeng Guan<sup>b</sup>

<sup>a</sup>*Institute of Electrical Engineering, Yanshan University, Qinhuangdao, 066004, China.*

<sup>b</sup>*Institute of Electronic, Information and Electrical Engineering, Shanghai Jiao Tong University, Shanghai, 200240, China.*

---

## Abstract

This paper investigates the finite-time consensus problem of uncertain nonlinear multi-agent systems with asymmetric time-varying delays and directed communication topology. An auxiliary system is firstly designed to deal with the continuous or discontinuous time-varying communication delays. Based on the finite-time input-to-output framework, a novel consensus scheme relying on local delayed information exchange is proposed. Moreover, by utilizing an auxiliary integrated regressor matrix and vector method, the system uncertainties can be accurately estimated. Then the consensus of multi-agent systems can be achieved within finite time by selecting the control gains simply. Finally, numerical simulations are provided to demonstrate the effectiveness of the proposed control algorithms.

**Keywords:** Multi-agent systems, finite-time consensus, asymmetric time-varying delay, ISS

---



---

\*Corresponding author. Tel.: +8613643361077

Email address: xyluo@ysu.edu.cn (Xiaoyuan Luo)

Download English Version:

<https://daneshyari.com/en/article/6952826>

Download Persian Version:

<https://daneshyari.com/article/6952826>

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