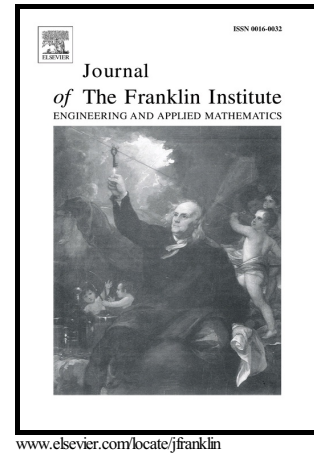


Author's Accepted Manuscript

Event-triggered consensus control for leader-following multi-agent systems with time-varying delays

Aiping Wang, Yue Zhao



PII: S0016-0032(16)30311-8
DOI: <http://dx.doi.org/10.1016/j.jfranklin.2016.08.027>
Reference: FI2709

To appear in: *Journal of the Franklin Institute*

Received date: 11 October 2015
Revised date: 18 August 2016
Accepted date: 27 August 2016

Cite this article as: Aiping Wang and Yue Zhao, Event-triggered consensus control for leader-following multi-agent systems with time-varying delays
Journal of the Franklin Institute
<http://dx.doi.org/10.1016/j.jfranklin.2016.08.027>

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.

Event-triggered consensus control for leader-following multi-agent systems with time-varying delays

Aiping Wang^{a,*}, Yue Zhao^b

^a*Department of Mathematics, Harbin Institute of Technology, Harbin, 150001, China.*

^b*Department of Control Science and Engineering, Harbin Institute of Technology, Harbin, 150001, China.*

Abstract

In this paper, we perform the delay robustness analysis of an event-triggered consensus protocol for a leader-following multi-agent system with time-varying communication delays, and focus on designing the consensus protocol as well as event-triggering conditions in order that all followers can track the state of the leader at low communication/controller-updating costs. The leader has unidirectional communication connections to at least one follower. The local communication structure among followers is characterized by an undirected connected graph. It is shown that the maximum allowable time delay depends on the largest eigenvalue of the interaction graph Laplacian, event-checking period and one protocol parameter. The relationship between the maximum allowable time delay and the change rate of time delays is also characterized. Finally, numerical examples are given to demonstrate the effectiveness of the proposed consensus protocol.

Keywords: Multi-agent systems; leader-following networks; consensus problems; event-triggered control; time-varying delays.

1. Introduction

During the past decade, coordination control of multi-agent systems has attracted considerable attention due to its wide applications in solving numerous theoretical and engineering problems, such as flocking analysis of animals [1], formation control of multiple unmanned air vehicles [2, 3, 4, 5, 6, 7], and attitude synchronization of satellite clusters [8]. In practice, multiple autonomous agents can cooperate to efficiently accomplish a complex task under specified conditions by local interactions among them. One basic coordination problem in multi-agent systems is the consensus control, which aims to drive all agents to reach an expected common state under the designed agents' communication and interaction

*Corresponding Author.

Email addresses: aiping@hit.edu.cn (Aiping Wang), yue.zhao@hit.edu.cn (Yue Zhao)

Download English Version:

<https://daneshyari.com/en/article/4974233>

Download Persian Version:

<https://daneshyari.com/article/4974233>

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