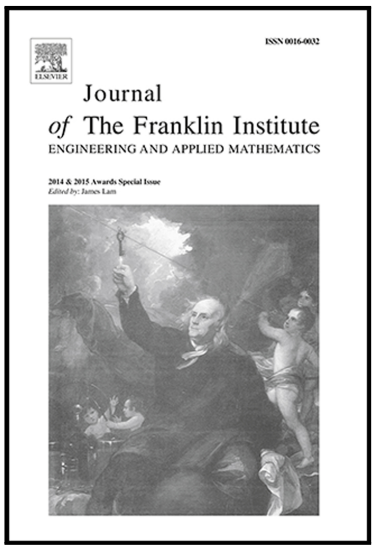

Finite-time Consensus of Linear Multi-Agent System via Distributed Event-Triggered Strategy

Zhengran Cao, Chuandong Li, Xin Wang, Tingwen Huang

PII: S0016-0032(18)30034-6
DOI: 10.1016/j.jfranklin.2017.12.026
Reference: FI 3278

To appear in: *Journal of the Franklin Institute*

Received date: 14 March 2017
Revised date: 13 September 2017
Accepted date: 11 December 2017

Please cite this article as: Zhengran Cao, Chuandong Li, Xin Wang, Tingwen Huang, Finite-time Consensus of Linear Multi-Agent System via Distributed Event-Triggered Strategy, *Journal of the Franklin Institute* (2018), doi: 10.1016/j.jfranklin.2017.12.026

Finite-time Consensus of Linear Multi-Agent System via Distributed Event-Triggered Strategy

Zhengran Cao[a], Chuandong Li[a], Xin Wang[a], Tingwen Huang[b]

[a]*School of Electronic and Information, Chongqing Key Laboratory of Nonlinear Circuits and Intelligent Information Processing, China Southwest University, Chongqing 400715, P.R. China.*
[b]*Texas A & M University at Qatar, Doha, P.O. Box 23874, Qatar*

Abstract

In this paper, we mainly investigate the finite-time consensus problem of general linear multi-agent systems. The paper proposed a suitable event-triggered control strategy. The strategy has some desirable properties including: distributed, independent, and asynchronous. It is theoretical demonstrated that the multi-agent system can achieve consensus in a certain time regardless of the initial condition under this event-triggered control scheme. In addition, without finding singular triggering problem, we prove the feasibility of this proposed event-triggered control protocol. Finally, we put forward some simulation graphs for the sake of showing the availability of our conclusions.

Key words: Finite-time consensus; linear dynamics; event-triggered.

1. Introduction

The topic about the distributed control of multi-agent systems as one of the most demonstrating topics, has aroused extensive concern among scholars in the last few years. In many applications, some complicated tasks can be accomplished due to a group of vehicles, mobile sensors or robots work together. Such applications such as environmental monitoring, synchronization of multiple micro satellite attitudes, autonomous configuration of the distributed mobile sensor network are described in [1]-[4]. In these cases, the states of all agents need to reach a common value while each agent can only communicate with its adjacent agents. Thus, this kind of problem could be described as the consensus problem of multi-agent systems under distributed setting. We could find some representative conclusions on this topic in [5]-[12]. In particular, some results have been established on consensus problem with single-integrator dy-

*Corresponding author at: School of Electronic and Information, Chongqing Key Laboratory of Nonlinear Circuits and Intelligent Information Processing, China Southwest University, Chongqing 400715, P.R. China.

Email addresses: cdli@swu.edu.cn (Chuandong Li), xinwangswu@163.com (Xin Wang), tingwen.huang@qatar.tamu.edu (Tingwen Huang)