

Accepted Manuscript

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Chen Peng, Fuqiang Li

PII: S0020-0255(18)30306-2
DOI: [10.1016/j.ins.2018.04.055](https://doi.org/10.1016/j.ins.2018.04.055)
Reference: INS 13598



To appear in: *Information Sciences*

Received date: 13 January 2018
Revised date: 9 April 2018
Accepted date: 15 April 2018

Please cite this article as: Chen Peng, Fuqiang Li, A survey on recent advances in event-triggered communication and control, *Information Sciences* (2018), doi: [10.1016/j.ins.2018.04.055](https://doi.org/10.1016/j.ins.2018.04.055)

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A survey on recent advances in event-triggered communication and control

Chen Peng^a, Fuqiang Li^{b,a}

^a*School of Mechatronics Engineering and Automation, Shanghai University, Shanghai 200072, China*

^b*College of Sciences, Henan Agricultural University, Zhengzhou 450002, China*

Abstract

Event-triggered communication and control have been a hot research topic in networked control systems. This paper provides a survey on recent advances in event-triggered schemes, modelling, stability and controller design of event-triggered control (ETC) systems. First, a deep investigation is made into some existing event-triggered schemes, including event-triggered sampling schemes, self-triggered sampling schemes and discrete event-triggered communication schemes. Second, four notable models for ETC systems: hybrid system model, piecewise system model, perturbed system model and time-delay system model, are surveyed in detail. Third, various methods for stability analysis and controller design are summarized. Finally, several challenges in event-triggered communication and control are presented for future research.

Keywords: Networked control systems, Event-triggered sampling and communication, Event-triggered control.

1. Introduction

Networked control systems (NCSs) are typical distributed control systems, where system components (such as sensors, controllers and actuators) are connected by a shared communication network [16, 48]. NCSs connect cyber space to physical space so that remote control and distributed control are allowable [35]. Due to advantages such as flexible architectures, low installation and maintenance cost, NCSs have been widely used in areas such as smart grids, intelligent transportation, offshore structures and unmanned marine vehicles [40, 42, 44].

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