

Accepted Manuscript

Robust sampled-data control invariance for Boolean control networks

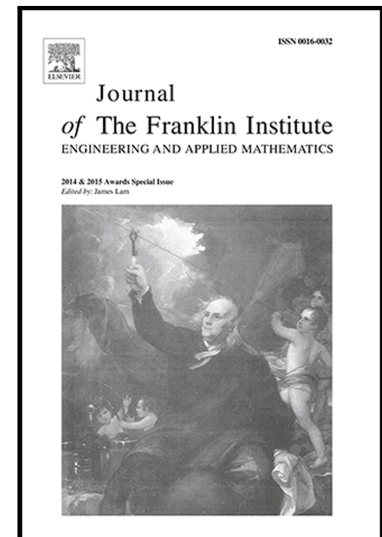
Liyun Tong, Yang Liu, Fuad E. Alsaadi, Tasawar Hayat

PII: S0016-0032(17)30390-3
DOI: [10.1016/j.jfranklin.2017.08.017](https://doi.org/10.1016/j.jfranklin.2017.08.017)
Reference: FI 3100

To appear in: *Journal of the Franklin Institute*

Received date: 16 March 2017
Revised date: 21 June 2017
Accepted date: 3 August 2017

Please cite this article as: Liyun Tong, Yang Liu, Fuad E. Alsaadi, Tasawar Hayat, Robust sampled-data control invariance for Boolean control networks, *Journal of the Franklin Institute* (2017), doi: [10.1016/j.jfranklin.2017.08.017](https://doi.org/10.1016/j.jfranklin.2017.08.017)



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.

Robust sampled-data control invariance for Boolean control networks

Liyun Tong^a, Yang Liu^{a,*}, Fuad E. Alsaadi^b and Tasawar Hayat^c

^a *College of Mathematics, Physics and Information Engineering, Zhejiang Normal University, Jinhua, China.*

^b *Department of Electrical and Computer Engineering, Faculty of Engineering, King Abdulaziz University, Jeddah 21589, Saudi Arabia.*

^c *Department of Mathematics, Quaid-I-Azam University, Islamabad, Pakistan.*

Abstract

In this paper, we investigate the robust sampled-data control invariance of Boolean control networks (BCNs) via the semi-tensor product of matrices. Necessary and sufficient conditions are obtained to check whether a set is a robust sampled-data control invariant set through a given sampled-data state feedback control (SDSFC). Moreover, a SDSFC is designed to make a given set to be a robust sampled-data control invariant set. At last, the study of model about lac operon in the Escherichia coli shows the effectiveness of the main results.

Keywords: Boolean control network, robust sampled-data control invariance, semi-tensor product

1. Introduction

As a powerful tool for bio-genetic engineering, the Boolean networks (BNs) [1] has attracted the interest of many experts and scholars, which used for simulating the genetic regulatory networks and cellular networks [2]. In BNs, each node can represent a gene with two states by 0 or 1

¹This work was supported by the National Natural Science Foundation of China under Grant No. 11671361 and the China Postdoctoral Science Foundation under Grant No. 2016T90406 and 2015M580378.

* Corresponding author, email: liuyang@zjnu.edu.cn.

Download English Version:

<https://daneshyari.com/en/article/6953278>

Download Persian Version:

<https://daneshyari.com/article/6953278>

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