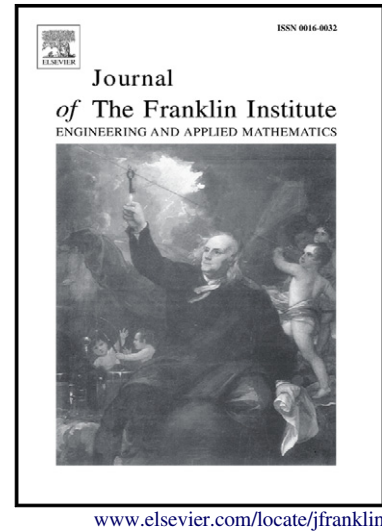


Approximately-nearly controllability of discrete-time bilinear control systems with control input characteristic

Xin Liu, Yu Huang, Mingqing Xiao



PII: S0016-0032(15)00043-5
DOI: <http://dx.doi.org/10.1016/j.jfranklin.2015.01.025>
Reference: FI2230

To appear in: *Journal of the Franklin Institute*

Received date: 19 June 2014
Revised date: 14 January 2015
Accepted date: 20 January 2015

Cite this article as: Xin Liu, Yu Huang, Mingqing Xiao, Approximately-nearly controllability of discrete-time bilinear control systems with control input characteristic, *Journal of the Franklin Institute*, <http://dx.doi.org/10.1016/j.jfranklin.2015.01.025>

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.

Approximately-Nearly Controllability of Discrete-Time Bilinear Control Systems with Control Input Characteristic [☆]

Xin Liu^a, Yu Huang^a, Mingqing Xiao^b

^a*School of Mathematics and Computational Science, Sun Yat-Sen University, Guangzhou
510275, China*

^b*Department of Mathematics, Southern Illinois University, Carbondale, IL 62901-4408,
USA*

Abstract

In this paper we study a class of discrete-time bilinear control systems that can be used to model the production storage management problems. A weaker but more applicable concept of controllability, approximately-nearly controllability, is proposed under the framework of hypercyclicity from the theory of dynamical systems. The complete characteristic of the system structure for being approximately-nearly controllable is provided. Necessary and sufficient conditions for the system to be approximately-nearly controllable are presented. Moreover, the required number of different input values for the system to achieve the approximately-nearly controllability during the evolutionary process is obtained.

Keywords: Discrete-time bilinear control systems; Controllability; hypercyclicity; Matrix semigroup.

Revision date: January 24, 2015

1. Introduction

A control system is called bilinear if it is described by linear differential equations in which the control inputs appear as coefficients. Bilinear systems are one of the simplest nonlinear systems and it is an important

[☆]This work was supported in part by the National Natural Science Foundation of China under Grant 11371380, and in part by NSF 1021203, 1419028 of the United States.

Email addresses: liuxin3105@126.com (Xin Liu), stshyu@mail.syu.edu.cn (Yu Huang), mxiao@math.siu.edu (Mingqing Xiao)

Download English Version:

<https://daneshyari.com/en/article/4975080>

Download Persian Version:

<https://daneshyari.com/article/4975080>

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