

论文

高阶布尔网络的结构

李志强¹, 赵寅², 程代展²

1. 河南财经政法大学数学与信息科学系, 郑州 450002;
2. 中国科学院数学与系统科学研究院系统控制重点实验室, 北京 100190

摘要:

介绍高阶布尔(控制)网络, 并研究了其拓扑结构. 以矩阵的半张量积作为工具, 把高阶布尔网络的动态过程转化为2种标准离散事件动态系统的代数形式. 证明了高阶布尔网络和第1代数形式的一一对应关系, 并由此得到其拓扑结构(不动点、极限圈以及暂态期等). 还研究了高阶布尔网络系统与它第2代数形式的关系.

关键词: 高阶布尔网络 代数形式 不动点 极限圈 暂态期

Structure of higher order Boolean networks

LI Zhi-Qiang¹, ZHAO Yin², CHENG Dai-Zhan²

1. Department of Mathematics and Information Science, Henan University of Economics and Law, Zhengzhou 450002, China;
2. Key Laboratory of Systems and Control, Academy of Mathematics and Systems Science, Chinese Academy of Sciences, Beijing 100190, China

Abstract:

The higher order Boolean (control) network is introduced and its topological structure is studied. Using semi-tensor product of matrices, its dynamics is converted into two algebraic forms, which are standard discrete-time dynamic systems. The one-to-one correspondence of the network dynamics and its first algebraic form is proved, and certain topological structures, including fixed points, cycles, and transient time, of higher order Boolean (control) networks are revealed. The relationship between the original system and its second algebraic form is also studied.

Keywords: higher order Boolean network algebraic form fixed point cycle transient period

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通讯作者:

作者简介:

作者Email: lizhiqiang@amss.ac.cn

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