论文与报告

基于改进齐次多项式技术的离散时间2-D T-S模糊系统的收敛镇定条件

解相朋, 张化光

1. 教育部流程工业综合自动化实验室 沈阳 110004

2. 东北大学信息科学与工程学院 沈阳 110004

摘要
通过利用改进的齐次多项式技术来研究了Roesser型二维T-S模糊系统的镇定设计问题. 首先, 提出了一种用来镇定该二维T-S模糊系统的一种新型非二次控制率, 并且通过应用两种改进的齐次多项式技术得到了保守性更小的镇定条件. 随着所选用的齐次多项式参数依赖矩阵度数的增加, 所得结果的保守性会越来越小. 其次, 为了继续减少保守性, 提出了一种新的右侧松弛变量引入方法, 该方法适合于齐次多项式情形. 最后, 仿真实验验证了所提方法的有效性.
关键词   Roesser模型   2-D离散时间系统   线性矩阵不等式   非二次镇定   齐次多项式矩阵
分类号

Convergent Stabilization Conditions of Discrete-time 2-D T-S Fuzzy Systems via Improved Homogeneous Polynomial Techniques

XIE Xiang-Peng, ZHANG Hua-Guang

1. Key Laboratory of Integrated Automation for the Process Industry, Ministry of Education, Shenyang 110004, P.R. China

2. School of Information Science and Engineering, Northeastern University, Shenyang 110004, P.R. China

Abstract
This paper is concerned with the problem of stabilization of the Roesser type discrete-time 2-D T-S fuzzy system via some improved homogeneous polynomial techniques. First, a novel kind of non-quadratic control scheme is proposed to stabilize the underlying 2-D T-S fuzzy system, thus less conservative stabilization conditions are attained by applying two kinds of improved homogeneous polynomial techniques. As the degree of the homogeneous polynomially parameter-dependent matrix increases, these attained sufficient conditions may be asymptotically necessary in a convergent sense. Second, for the sake of further reducing conservatism, a new right-hand-side slack variables introducing approach which suits the homogenous polynomial setting is also proposed. Finally, a numerical example is provided to illustrate the effectiveness of the proposed methods.
Key words   Roesser model   2-D discrete-time systems   linear matrix inequality (LMI)   non-quadratic stabilization   homogeneous polynomial matrix

通讯作者   解相朋 xiexiangpeng1953@163.com
作者个人主页   解相朋; 张化光