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论文与报告

Delta算子系统具有圆形区域极点约束的非脆弱H_∞滤波器设计: 一种LMI优化方法

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摘要

研究了一类Delta算子线性系统具有圆形区域极点配置的非脆弱 H_∞滤波器设计问题. 本文的目的是设计滤波器使得滤波误差系统不仅满足给定的圆点极点约束或D稳定约束, 而且从扰动输入到滤波误差的传递函数满足给定的 H_∞范数约束. 所设计的滤波器具有乘性的滤波器增益变化, 基于Lyapunov稳定性理论和线性矩阵不等式方法, 给出具有区域极点配置的Delta算子离散系统非脆弱 H_∞滤波器存在的充分条件. 数值仿真例子说明设计方法的有效性以及所提设计方法具有更小的保守性.

关键词 Delta算子系统 非脆弱 H_∞滤波 乘性增益变量 线性矩阵不等式(LMI)

分类号

Non-fragile H_∞ Filter Design for Delta Operator Formulated Systems with Circular Region Pole Constraints: an LMI Optimization Approach

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Abstract

The problem of non-fragile H_∞ filtering for a class of linear systems described by delta operator with circular region pole constraints is investigated. The purpose of the paper is to design a filter such that the error filtering system not only satisfies the prescribed circular pole constraints or D-stability constraint, but also meets the prescribed H_∞ norm constraint on the transfer function from the disturbance input to the estimation error. The filter gain to be designed is assumed to have multiplicative gain variations. A sufficient condition for the existence of such a filter is obtained by using appropriate Lyapunov function and linear matrix inequality (LMI) technique. A numerical example is provided to demonstrate the effectiveness and less conservativeness of the proposed design.

Key words Delta operator systems non-fragile H_∞ filtering multiplicative gain variations linear matrix inequality (LMI)

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