

含有Markov参数的广义离散系统的 H_∞ 控制

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摘要 针对一类含有Markov跳变参数和时滞的广义离散系统的 H_∞ 控制问题, 提出一种基于模态跳变的无记忆状态反馈控制器的设计方法. 通过将行列式方程的可解性转化为矩阵的最大特征值与零的关系, 使得含有Markov跳变参数广义系统的正则性转化为系统矩阵最大特征值的问题, 并应用矩阵的线性变换与分块技术来保证系统的因果性. 同时利用构造的Lyapunov函数和线性矩阵不等式, 证明并给出了系统容许性的充分条件, 提出了次优 H_∞ 控制设计方法, 所设计的控制器使得系统满足所给定的 H_∞ 衰减水平. 数值仿真结果表明, 所设计的控制器使得闭环系统拥有容许性, 同时系统对于干扰有很强的抑制能力.

关键词 [广义离散系统](#) [容许性](#) [\$H_\infty\$ 控制](#) [线性矩阵不等式](#)

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H_∞ control of discrete-time descriptor systems with Markov jumping parameters

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Abstract

In order to solve the H_∞ control problem for a class of discrete singular systems with markov parameters, a design method based on the memoryless state feedback controller of mode-jumping is proposed. By transforming the solvability of the determinant equation into the relationship between the eigenvalue of the matrix and zero, the problem of regularity is converted to the magnitude of the maximum eigenvalue, and the causality is guaranteed in terms of linear transformation and the block matrix. By using the constructed Lyapunov function and linear matrix inequalities, a sufficient condition that the systems be admissible is given and proved, and a sub-optimal design approach is presented. The controller is designed and the prescribed H_∞ performance condition is satisfied. Simulation results demonstrate that the proposed method is valid and that the system has strong restraint ability against disturbance.

Key words [discrete singular system](#) [admissible](#) [\$H_\infty\$ control](#) [linear matrix inequalities](#)

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