科研论文 9

Chapter 35
Decentralized Robust Predictive Control for Convex Polyhedral Uncertain Large-Scale Systems

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Abstract When the system states are unmeasurable, the problem of decentralized robust predictive control with output feedback is studied for convex polyhedral uncertain large-scale system. By constructing the Lyapunov function, and with the idea of variable transformation and LMI methods, the infinite time domain "min-max" optimization problems are converted into convex programming problems. The sufficient conditions for the existence of this controller are derived. The controller enables the closed-loop large-scale systems robust stable. A simulation example shows the effectiveness of the control algorithm.

Keywords Robust predictive control · Uncertain large-scale systems · Decentralized control · Output feedback · Linear matrix

35.1 Introduction

Predictive control, a kind of optimal control algorithm, has to solve the optimization problem to get the controlled variable at each sample instant. However, it is different from the discrete optimal control algorithm. Instead of taking a global optimization target, predictive control applies the optimization strategy in which its time rolls forward on the limited time domain. The procedure is an iterative process [1]. Owing to the limited information structure, the centralized control often generates the problem of insufficient information. The predictive control can solve this problem well. As a result, centralized predictive control becomes a powerful tool for dealing with large system control. Many scholars have studied this problem and obtained good results [2, 3]. In [2], the author has studied the scattered generalized predictive algorithm of the interconnected large-scale systems by estimating the

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