

ROBUST STABILITY AND ROBUST STABILIZATION OF DISCRETE-TIME LINEAR STOCHASTIC SYSTEMS*

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Abstract

In this paper the problem of robust stabilization of a general class of discrete-time linear stochastic systems subject to Markovian jumping and independent random perturbations is investigated. A stochastic version of the bounded real lemma is derived and the small gain theorem is proved. Finally, methodology for the designing of a stabilizing feedback gain for discrete-time linear stochastic system with structured parametric uncertainties is proposed.

MSC: 93E15, 93E20, 93C55, 93B36

keywords: discrete-time stochastic systems, input-output operators, bounded real lemma, small gain theorem, disturbance attenuation problem

1 Introduction

In many applications the mathematical model of the controlled process is not completely known. Even if the multiplicative white noise perturbations are introduced in order to model the stochastic environmental perturbations which are hard to quantify, it is also possible that some parametric uncertainties occur in the coefficients of the stochastic system. Thus a robust

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