自动化学报 2003 29 (04): 633-640 ISSN: 0254-4156 CN: 11-2109/TP

短文

乘性随机离散系统的最优控制

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收稿日期 2001-8-15 修回日期 网络版发布日期 接受日期

摘要
基于对系统随机不确定因素的分析,文中定义了一种新型随机离散系统--乘性随机离散系统,并研究该类系统的线性二次型(LQ)最优控制问题.首先给出了该类系统的有限时间和无限时间LQ最优控制律,并着重分析、证明了无限时间LQ最优控制问题的Riccati方程的正定矩阵解的存在性及相应数值求解算法与收敛性,以及闭环系统的稳定性等问题.仿真结果表明了该方法的有效性.

关键词 随机离散系统 最优控制 噪声 乘性摄动

分类号

Optimal Control for Multiness Stochastic Discrete Systems

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Abstract
Based on the analysis of stochastic uncertainty in dynamical systems, a new type of stochastic discrete systems, named as the multiness stochastic discrete systems, is defined and then the linear quadric(LQ) optimal control problem for the systems is discussed. Firstly, the LQ optimal control laws with finite time and infinite time are proposed respectively. Secondly, the existence of the positive define matrix solution to the Riccati equation for solving the infinite-time LQ control law, the convergence of the numerical algorithm for solving the equation, and the stability of the closed-loop systems are discussed in detail. Finally, the simulation results show the effectiveness of the method proposed in this paper.

Key words Stochastic discrete systems optimal control noise multiness disturbance

DOI:

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