自动化学报 1990 16 (01): 66-70 ISSN: 0254-4156 CN: 11-2109/TP

短文

利用超稳定性理论证明随机自适应控制算法的稳定性

何勤奋,史维

东南大学

收稿日期 1987-5-9 修回日期 网络版发布日期 接受日期

摘要
超稳定性理论是自适应控制稳定性证明的有力工具,但至今它只限于确定性系统.通过对超稳定性理论进一步研究和算法结构变化,本文给出了利用超稳定性理论证明随机自适应控制(特别是Goodwin的随机逼近法)的稳定性.结果表明,与目前的证明方法--Martingale 函数法和Ljurg的ODE法相比,超稳定性方法有相当的优越性.它不需要象Martingale 函数法那样去构造一个相当困难的随机Lyapunov函数,也可放松ODE法所必需的系统噪声平稳的条件.

关键词 超稳定性 正实函数 自适应控制

分类号

Hyperstability Theory for Stability Proofs of Stochastic Adaptive Control Algorithms

He Qinfen,Shi Wei

Southeast University

Abstract
Hyperstability theory is a significant tool for stability proofs of adaptive control, but so far it is only used for deterministic systems. Based on a further study of hypestability theory and a suitable conversion of the adaptive control construction, hyperstability theory are used for the stability proofs of stochastic adaptive control. It is shown that hyperstability theory can be used in stochastic case and has advantages over the previous Martingale function method and Ljung's ODE method. Comparing with the Martingale method, it does not require to build sedulously a stochastic Lyapunov function, which is usually very difficult to do. And it also omits the condition of stationary process of system noise, which is necessary in Ljung's ODE method.

Key words Hyperstability positive real function adaptive control

DOI:

通讯作者

作者个人主页 何勤奋;史维