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论文与报告

具有正弦扰动的时滞系统前馈-反馈次优控制:灵敏度法

唐功友,马慧

中国海洋大学信息科学与工程学院， 青岛 266071

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摘要
研究线性时滞系统在外部正弦扰动作用下的前馈-反馈最优减振问题,提出了一种最优控制律的灵敏度设计方法．通过引入灵敏度参数并围绕它展开幂级数,将系统的最优控制问题简化为不含超前项和时滞项的两点边值问题族．通过截取最优控制级数的有限和获得原系统的前馈-反馈次优控制律．仿真结果表明,与经典状态反馈最优控制相比,本文的算法更加鲁棒,能更加有效地抑制正弦扰动．

关键词 时滞系统 灵敏度法 正弦扰动 最优控制 前馈-反馈控制
分类号

Feedforward and Feedback Suboptimal Control for Time-Delay Systems with Sinusoidal Disturbances: A Sensitivity Approach

TANG Gong-You, MA Hui

College of Information Science and Engineering，Ocean University of China， Qingdao 266071

Abstract
The optimal disturbance rejection problem for linear time-delay systems affected by sinusoidal disturbances is considered. The paper proposes a sensitivity approach to design of feedforward and feedback optimal control law. By introducing a sensitivity parameter and expanding power series around it, the optimal control problem is reduced to a series of two-point boundary value problems without time-advance or time-delay terms. By intercepting finite sum of the optimal control series, a suboptimal control law for the system is obtained. Simulations show that the algorithm presented in this paper is more efficient to damp external sinusoidal disturbances than the classical feedback optimal control law.

Key words Time-delay systems sensitivity approach sinusoidal disturbances optimal control feedforward and feedback control

DOI:

通讯作者 唐功友 gtang@ouc.edu.cn

作者个人主页 唐功友;马慧