

短文

## 时变不确定性系统的二自由度最优鲁棒稳态跟踪控制器设计

李晟平

汕头大学机械电子工程系,汕头

收稿日期 2000-1-10 修回日期 网络版发布日期 接受日期

摘要

研究了被控系统存在范数有界的时变模型摄动和未知外部干扰时鲁棒稳态跟踪问题. 利用二自由度控制结构和Youla参数化方法. 提出了一个最坏情况稳态绝对误差的精确计算公式, 利用该公式最优稳态跟踪控制器设计问题可化为一个有限维 $H_1$ 优化问题. 因此控制器设计只需解一个标准线性规划问题. 此外, 还证明了所提出的控制器可同时保证系统的鲁棒稳定性和最优跟踪性能. 仿真结果表明了该方法的有效性和可行性.

关键词 [最优稳态跟踪](#) [二自由度控制](#)  [\$H\_1\$ 优化设计](#) [时变不确定性](#)

分类号 [TP273](#)

## Two Degree Optimal Robust Steady-State Tracking Controller Design for Plant with Time-Varying Uncertainty

LI Sheng-Ping

Department of Mechatronics Engineering, Shantou University, Shantou

Abstract

This paper addresses the robust steady-state tracking problem when the system under consideration is subject to norm bounded time-varying uncertainty as well as unknown external bounded disturbances. With the help of two-degree control scheme and Youla parameterization, we propose an exact formula for computing the worst-possible steady-state absolute value of the control error. Using this formula, we show that the problem of designing a controller that minimizes the worst case steady-state controller error is reduced to a finite dimensional  $H_1$  optimization problem. Hence, the proposed controller can be obtained by solving a standard linear programming problem. We also demonstrate that the proposed controller ensures both optimal robust stability and optimal steady-state tracking performance. The experimental results have manifested the approach's effectiveness.

Key words [Optimal steady-state tracking](#) [two-degree control](#)  [\$H\_1\$  optimization design](#) [time-varying uncertainty](#)

DOI:

通讯作者 李晟平

作者个人主页 李晟平

### 扩展功能

本文信息

- ▶ [Supporting info](#)
- ▶ [PDF \(536KB\)](#)
- ▶ [\[HTML全文\]\(OKB\)](#)
- ▶ [参考文献\[PDF\]](#)
- ▶ [参考文献](#)

服务与反馈

- ▶ [把本文推荐给朋友](#)
- ▶ [加入我的书架](#)
- ▶ [加入引用管理器](#)
- ▶ [复制索引](#)
- ▶ [Email Alert](#)
- ▶ [文章反馈](#)
- ▶ [浏览反馈信息](#)

相关信息

- ▶ [本刊中 包含“最优稳态跟踪”的相关文章](#)
- ▶ 本文作者相关文章
- [李晟平](#)