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论文与报告

# 具有磁滞输入非线性系统的鲁棒自适应控制

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摘要
就一类具有磁滞输入的严反馈非线性系统, 提出了一种鲁棒自适应动态面控制方案. 该方案可克服传统反推控制带来的“微分爆炸”问题, 保证闭环系统的半全局稳定性, 且跟踪误差可收敛到任意小的残集内. 特别地, 通过引入动态面修正及初始化技巧, 可保证系统跟踪误差的$L_\infty$性能指标. 数值仿真验证了本文所提方法案的有效性.

关键词 动态面控制 类间隙磁滞 自适应控制 反推法

分类号

# A Robust Adaptive Dynamic Surface Control for Nonlinear Systems with Hysteresis Input

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Abstract
In this paper, a robust adaptive dynamic surface control (DSC) for a class of uncertain perturbed strict-feedback nonlinear systems preceded by unknown backlash-like hysteresis is proposed. The main advantages of our scheme are that it can eliminate the explosion of complexity problem when the hysteresis is fused with backstepping design, and by introducing an initializing technique, and the $L_\infty$ performance of system tracking error can be guaranteed. It is proved that the new scheme can guarantee semiglobal stability of the closed-loop system and make the convergence of the tracking error into an arbitrarily small residual set. Simulation results are presented to demonstrate the efficiency of the proposed scheme.

Key words Dynamic surface control (DSC) backlash-like hysteresis adaptive control backstepping

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