

基于分布参数模型的柔性臂变结构控制

曹小涛, 李元春

吉林大学 通信工程学院, 长春 130022

收稿日期 2007-7-23 修回日期 2007-12-28 网络版发布日期 2008-6-29 接受日期 2008-1-14

摘要 提出了一种针对柔性臂分布参数模型的变结构控制方法, 解决了系统存在参数不确定性和在外部干扰下的镇定问题。通过Lyapunov函数方法设计了系统的变结构控制器, 其中滑模面设计为关节角、关节角速度和柔性臂根部应变的线性组合。由线性算子半群理论和LaSalle不变集原理证明了闭环系统是渐近稳定的。仿真结果验证了该方法的有效性。

关键词 [自动控制技术](#) [柔性臂](#) [变结构控制](#) [线性算子半群](#) [LaSalle不变集原理](#)

分类号 [TP241](#)

Variable structure control of flexible manipulator based on distributed parameter model

Variable structure control of flexible manipulator based on distributed parameter model

College of Communication Engineering, Jilin University, Changchun 130022, China

Abstract A sliding mode variable structure control method was proposed based on distributed parameter model of flexible manipulator, and the stabilization problem of the controlled system with uncertain parameter and disturbance was resolved. The variable structure controller was designed by use of Lyapunov function method, and sliding surface was chosen as a linear combination of joint angle, joint angle velocity and root strain of flexible manipulator. An asymptotical stability of the closed loop system was proved by using linear operator semigroup and LaSalle invariance principle. Simulation results were presented to validate the proposed controller performance.

Key words [automatic control technology](#) [flexible manipulator](#) [variable structure control](#) [semigroup of linear operator](#) [LaSalle invariance principle](#)

DOI:

通讯作者 李元春 liy@email.jlu.edu.cn

扩展功能	
本文信息	
▶	Supporting info
▶	PDF(588KB)
▶	[HTML全文](0KB)
▶	参考文献
服务与反馈	
▶	把本文推荐给朋友
▶	复制索引
▶	文章反馈
▶	浏览反馈信息
相关信息	
▶	本刊中 包含“自动控制技术”的相关文章
▶本文作者相关文章	
·	曹小涛
·	李元春