论文与报告

动态不确定系统的变结构控制器设计

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摘要
该文提出了一种仅用输入和输出信号实现的变结构控制方案. 引入了一个严格正实的比较模型和具有适当逻辑切换的状态变量过滤器. 文中分别讨论了系统建模部分的相对阶为1 和大于1的情况. 当相对阶为1时所设计的系统能实现滑模控制. 在相对阶大于1的情况下尚须引入一个符号跟随系统,证明了所设计的系统全局有界稳定. 理论分析和仿真表明了该文算法对系统的参数不确定性和结构不确定性具有一定的鲁棒性.
关键词　动态不确定系统　变结构控制　滑模控制　逻辑切换　鲁棒稳定性
分类号

The Design of Variable Structure Robust Controller for Uncertain Dynamic Systems

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Abstract
A variable structure control scheme which only uses the input-output measurements is presented in this paper. A strictly positive real comparison model and the state variable filters with logic switchings are introduced. Two cases where the relative degree of the modeled part of the plant is equal to one and greater than one are studied respectively. When the relative degree equals one, it is proved that the designed control system can implement the sliding mode control. A sign following system is used for the case when the relative degree is greater than one. It is proved that the designed control system guarantees the global stability. It is show that the proposed scheme is robust for systems with parametric uncertainties and unstructured uncertainties.
Key words　Uncertain dynamic systems　Variable structure control　Sliding mode control　Logic switchings　Robust stability

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