航空学报 » 1999, Vol. 20 » Issue (6) :533-536 DOI:

某型涡扇发动机的模型跟踪滑模控制

冯正平[1], 孙健国[1], 刘冬[2]

1. 南京航空航天大学动力工程系, 江苏南京 210016;2. 贵州平坝300 信箱设计部, 贵州平坝 561102

MODEL FOLLOWING SLIDING MODE CONTROL FOR A TURBOFAN ENGINE

FENG Zheng-ping[1], SUN Jian-guo[1], LIU Dong[2]

1. Dept. of Power Engin., Nanjing Univ. of Aero. and Astro.,Nanjing 210016, China;2. Design Dept., P.O.Box 300,Pingba, Guizhou 561102, China

摘要 研究了模型跟踪滑模控制在涡扇发动机控制中的应用。首先提出了一种参考模型的状态反馈设计方法，该方法可保证所设计的参考模型在满足匹配条件的同时满足系统性能指标要求；而且若被控对象可解耦，还可保证参考模型动态解耦。其次提出了一种比例积分型切换超平面的极点配置设计方法。最后应用上述两种方法设计了某型涡扇发动机的模型跟踪滑模控制器，并进行了数字仿真，仿真结果表明，所设计的模型跟踪滑模控制系统无抖振现象，且具有很强的鲁棒性。

关键词： 滑模控制 参考模型 切换超平面 状态反馈 涡扇发动机

Abstract： This paper studies the application of model following sliding mode control (MFSMC) to a turbofan engine. Firstly, a method of state feedback is proposed for designing a reference model; so the reference model not only satisfies the matching conditions but also meets the performance specifications as well and moreover if the plant is decouplable, the reference model can be designed to be decoupled. Secondly, a method of pole assignment is put forward for designing switching surfaces of PI type. Finally, the MFSMC controller for a turbofan engine is designed using the above mentioned methods; dynamic simulation results show that the designed MFSMC system has no chattering phenomena and has strong robustness.

Keywords： sliding mode contr ol r eference model switching surfaces sta te feedback tur bofan engine

Received 1998-10-20; published 1999-12-25

引用本文:

冯正平;孙健国;刘冬. 某型涡扇发动机的模型跟踪滑模控制[J]. 航空学报, 1999, 20(6): 533-536.

FENG Zheng-ping;SUN Jian-guo;LIU Dong. MODEL FOLLOWING SLIDING MODE CONTROL FOR A TURBOFAN ENGINE[J]. Acta Aeronautica et Astronautica Sinica, 1999, 20(6): 533-536.