

论文与报告

执行器故障及外界干扰下动态系统的容错控制

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摘要

研究执行器故障和外界扰动同时存在时动态系统的容错控制问题, 推广和改进了现有相关结果. 具体包括以下几方面: 所提方法不涉及求解含执行器故障变量(时变且未知)的Lyapunov方程; 在设计和实现本文提出的控制方案时, 不需要对执行器故障范围界值进行人工估算; 能有效抑制执行器故障及有界和无界外部干扰对系统性能的影响. 在一定意义上, 现有相关结果仅是本文的一个特例, 且本文所提方案更有效、更易于设计和实现, 因为它不依赖于故障的任何解析信息, 无需知道执行器故障发生的时间及界值大小等.

关键词 [容错控制](#) [执行器故障](#) [鲁棒自适应控制](#) [无界扰动](#)

分类号

On Fault-tolerant Control of Dynamic Systems with Actuator Failures and External Disturbances

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Abstract

This paper extends and improves the existing result on fault-tolerant control (FTC) of dynamic systems with actuator failures and external disturbances in several aspects. More specifically, the proposed method does not involve solving Lyapunov equation that contains time-varying and unknown variables associated with actuator failures; one does not need to analytically estimate the bound on the actuator failure factors in designing and implementing the proposed control scheme; the developed FTC is able to attenuate both bounded and unbounded external disturbances under actuator failures. To some extent, the results presented here include the existing results as a special case and the resultant control algorithms are fault-independent in that there is no need for explicit fault information in terms of its magnitude (size), or time instance of the fault occurrence, thus, is more user-friendly for control design and more feasible for implementation as compared with the existing work.

Key words [Fault-tolerant control \(FTC\)](#) [actuator failure](#) [robust adaptive control](#) [unbounded disturbance](#)

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