短文

基于状态观测器的鲁棒故障诊断滤波器设计LMI方法

钟麦英,汤兵勇,Steven X.Ding

山东大学控制科学与工程学院,济南;东华大学工商管理学院,上海;Lausitz University of Applied Sciences,Senftenberg,Germany

摘要
研究受不确定性扰动影响情况下线性时不变连续时间系统的鲁棒故障诊断滤波器设计问题. 引入一种新的体现残差对于故障信号灵敏度和不确定性扰动鲁棒性的性能指标, 从系统的L2增益角度出发, 将基于状态观测器的鲁棒故障诊断滤波器设计问题形成为H∞优化问题. 然后应用线性矩阵不等式技术, 给出并证明了该设计问题的解存在条件和求解方法. 并通过简例说明了算法的有效性.

关键词   故障诊断滤波器   残差信号   H∞优化   L2增益   线性矩阵不等式(LMI)

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An LMI Approach to Design Robust Observer-Based Fd Filter

ZHONG Mai-Ying,TANG Bing-Yong,Steven X. DING

Control Science and Engineering School of Shandong University,Jinan;Business and Administration School of Donghua University,Shanghai;Lausitz University of Applied Sciences,Senftenberg,Germany

Abstract
The robust fault detection filter design problem for linear time invariant continuous-time systems is studied in this paper. By introducing a new performance index which expresses the robustness issue of the generated residual, and from the viewpoint of L2-gain, the observer-based robust fault detection filter design problem is formulated as an H∞ optimization problem: Then the solvable condition of this optimization problem and further the solutions are derived by employing linear matrix inequality techniques. A numerical example illustrates the proposed approach.

Key words   Fault detection filter   residual signal   H∞-optimization   L2-gain   LMI

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通讯作者   钟麦英

作者个人主页   钟麦英;汤兵勇;Steven X.Ding

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