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点击复

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## T-S模糊控制在飞行器滚动通道设计中的应用研究

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Title: The Study on Application of T-S Fuzzy Control on Aircraft Roll Channel Design

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关键词: 二次稳定; 线性参变系统; 线性矩阵不等式; 并行分布补偿

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摘要: 应用线性参变系统二次稳定的充要条件, 采用Takagi Sugeno模糊模型对某飞行器的滚动通道动力学模型进行了逼近, 推导出公共正定矩阵P存在的条件, 将控制器的设计问题转化为线性矩阵不等式的凸优化问题, 综合考虑响应速度和输入限制等控制品质, 利用并行分布补偿方法设计了满足总体需求的二次稳定控制器。数字仿真的结果表明所设计的控制器能够较好地解决飞行器控制系统设计中的全局稳定性问题, 是一种研究飞行器控制系统设计的有效方法。

Abstract: Based on the sufficient and necessary condition of quadratic stability for linear parameter varying (LPV) system, Takagi-Sugeno (T-S) fuzzy model was adopted to approach the dynamic model of roll channel for some aircraft. The existence condition of the common positive matrix P was deduced, the design problem of controller was converted to the protruding optimization issue of linear matrix inequalities (LMI). Taking other control characters such as responding speed and the input limit into consideration, the quadratic stability controller which meets general demands was worked out using parallel distributed compensation (PDC) method. The results of digital simulation indicate that the controller solves general stability problem of aircraft control system, and the method is an effective on studying control system design of aircraft.

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备注/Memo: 收稿日期:2008-07-16 作者简介:孔德永 (1975-), 男, 河南太康人, 讲师, 研究方向:鱼雷总体及系统仿真。

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