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高阶Riccati方程加权阵选择方法及其在飞控中的应用

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Approach to Selecting the Weight Matrics of High Order Riccati Equation and Its Application to Airplane Control

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摘要 阐述了飞机着陆控制中存在的主要矛盾和问题,说明了采用鲁棒控制方法的必要性和可行性,设计了鲁棒稳定的H_∞状态反馈控制器。针对高阶Riccati方程加权矩阵选择困难的问题,给出了一种快速有效的参数选择算法:通过在一定区间范围内,随机改变权矩阵的取值,来搜索出满足条件的Riccati方程的解阵。给出了仿真算例并从理论及应用两个角度讨论了方法的优点与不足。

关键词： H_∞控制　Riccati方程　加权矩阵　鲁棒控制　飞机着陆控制

Abstract： The main problems of airplane landing control and solving methods are discussed in this paper. *H*-infinity robust control for airplane landing is studied. A parameter-selecting approach is proposed to determine the weight matrics of high order Riccati equation. By using this approach the weight matrics are created randomly in a specified area, and the positive solutions of Riccati equation can be searched after repeated calculation. A robust *H*-infinity state feedback controller is developed. Simulations show that stability and speed of the landing period are guaranteed by using the controller presented. Both the advantages and disadvantages of the approach are addressed.

Keywords： *H*-infinity control　Riccati equation　weight matrix　robust control　airplane landing control

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