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驾驶员模型参数与飞行品质关系的研究

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STUDY ON THE RELATIONS BETWEEN PILOT MODEL PARAMETERS AND FLYING QUALITIES

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摘要

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摘要 按 Neal-Smith准则要求,探讨了驾驶员模型参数与飞机飞行品质之间的关系。建立Neal-Smith准则的数学表达式,导出系统闭环幅频、相频特性对驾驶员模型参数变化的灵敏度公式,用牛顿迭代法,计算出满足 Neal-Smith准则条件的驾驶员模型参数,得出相应的闭环幅频、相频特性曲线,找出相应的驾驶员对飞行品质的评定等级。用该方法来计算和检查飞机的飞行品质是非常简捷的,且能看到驾驶员与飞行器之间关系是否合适和匹配

关键词: 飞行品质 驾驶员模型 Neal-Smith准则 系统灵敏度

Abstract: Relations between the pilot model parameters and the flying qualities of an aircraft are discussed based on the Neal Smith criterion requirements. Firstly, the Neal Smith criterion requirements are described in the mathematical formulae. Secondly, the closed loop system sensitivity formulae of the frequency region related to the pilot model parameters are proved on the basis of the mathematical formulas of the Neal Smith criterion requirements in this paper. Then, using the formulas, the pilot model parameters are calculated, which can match the Neal Smith criterion requirements. The frequency characters can be calculated from the airplane model and the pilot model. The pilot rate can be inferred based on the Neal Smith criterion requirements. The method is simple and convenient to evaluate the flying qualities, and can be used to judge whether the aircraft and the pilot are matched or not.

Keywords: flying qualities pilot model Neal-Smith criterion system sensitivity

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