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飞机越界阻滞过程中乘客安全性分析

王 云[1]，郑小平[1]，黄拳章[1,2]

(1. 清华大学航天航空学院，北京 100084；2. 西安高科技研究所，西安 710025)

PASSENGER SAFETY ANALYSIS DURING THE ARRESTING PROCESS FOR AIRCRAFT OVERRUN

WANG Yun[1], ZHENG Xiao-ping[1], HUANG Quan-zhang[1,2]

(1. School of Aerospace, Tsinghua University, Beijing 100084, China | 2. Xi’an Hi-tech Institute, Xi’an 710025, China)

摘要

飞机越界工程材料阻滞系统是用来防止飞机冲出跑道的专用设备，该系统必须保证乘客在阻滞过程中的安全性。该文通过合理的简化建立了阻滞过程中乘客安全性分析的动力学模型，将问题归结为一组非线性动力学方程。然后，通过相空间变换将问题转化为一阶非线性微分方程组，采用Runge-Kutta方法对方程组进行数值求解，且开发了相应的仿真程序。仿真算例表明：该文建立的动力学模型和计算结果是合理可信的，利用该文方法可以进行阻滞过程中乘客安全性的评价。

关键词： 飞机越界 工程材料阻滞系统 动力学模型 数值仿真 乘客安全性分析

Abstract:

The Engineered Materials Arresting System (EMAS) is used to prevent aircraft from overrunning the end of the runway and it must ensure the safety of the passengers during the arresting process. A dynamic model of the EMAS for passenger safety analysis is constructed as a set of nonlinear dynamic equations. Then, by phase-space transformation, the model is transformed into first-order nonlinear differential equations, which are numerically solved by Runge-Kutta method, and a simulation program is also completed. An example is presented to illustrate that the present method is reasonable and creditable, with which the safety of the passengers during the arresting process can be estimated.

Key words: aircraft overrun Engineered Materials Arresting System (EMAS) dynamic equations numerical simulation passenger safety analysis

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地址：北京清华大学新水利馆114室　邮政编码：100084
电话：(010)62788648　传真：(010)62788648　电子信箱：gclxbjb@tsinghua.edu.cn