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涡喷发动机加速控制系统数学模型及数字仿真

樊思齐, 徐芸华, 舒壮

西北工业大学

MATHEMATICAL MODEL AND DIGITAL SIMULATION OF TURBOJET ACCELERATION CONTROL SYSTEM

Fan Siqi, Xu Yunhua, Shu Zhuang

Northwestern Polytechnical University

摘要

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摘要

本文介绍了航空涡轮喷气发动机加速控制系统数学模型建立、数字仿真方法。由于加速过程是一个大偏离动态过程,因而发动机与加速控制器模型均用非线性方程描述,对非线性方程组求解和系统迭代方法本文进行了讨论。算例中分析了在不同飞行条件下发动机的加速规律。

关键词: 加速控制系统 数学模型 非线性方程 数字仿真

Abstract:

The acceleration performance of turbojet is one of the important characteristics. In terms of control system, an engine is the controlled object. The acceleration performance not only depends on the engine, but also on the controller, therefore both the engine and the controller must be combined in a control system to make research for this performance. This paper presents a mathematical model of the turbojet acceleration control system and digital simulation method. Because the engine acceleration is a large variation transient process, the models of the engine and the controller are described by nonlinear equations. The methods of solving nonlinear equations and iterative techniques of calculating acceleration control system are discussed in this paper. The calculating results, as compared with test results, show that the simulation for this system is satisfactory.

Keywords: acceleration control system mathematical model non-linear equation digital simulation

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