

唐世建, 童万军. 基于容积法的某涡扇发动机动态建模方法[J]. 航空动力学报, 2013, 28(3): 709~713

基于容积法的某涡扇发动机动态建模方法

Turbofan engine transient modeling based on inter-component volume method

投稿时间: 2012-04-06

DOI:

中文关键词: [容积法](#) [涡扇发动机](#) [发动机动态建模](#) [建模方法](#) [实时](#)

英文关键词: [inter-component volume \(ICV\) method](#) [turbofan engine](#) [engine transient modeling](#) [modeling approach](#) [real time](#)

基金项目:

作者	单位
唐世建	中国航空工业集团公司 中国燃气涡轮研究院, 成都 610500
童万军	中国航空工业集团公司 中国燃气涡轮研究院, 成都 610500

摘要点击次数: 312

全文下载次数: 356

中文摘要:

考虑了容腔的质量和能量的储能效应, 提出了基于容积法的涡扇发动机实时数学模型建模方法, 建立了容腔压力和温度的微分方程, 容腔的压力和温度可以用不迭代的数值法求解. 同时, 利用C++面向对象编程语言, 建立了某涡扇发动机动态模型. 用建立的发动机动态模型和商用软件Gasturb 10分别计算了发动机性能, 并进行了对比, 结果表明: 该模型与Gasturb 10的运算结果具有良好的一致性, 高压压气机转速、涡轮进口温度及压气机喘振裕度的响应结果最大相对误差小于1%. 容积法避免了数值迭代, 可以保证模型计算的实时性.

英文摘要:

The effect of mass and energy storage in a volume was considered. A modeling approach for real time turbofan engine model was presented by employed inter-component volume (ICV) method. The pressure and temperature differential equations were established. The pressure and temperature were calculated through numerical integral without iterative. A turbofan engine transient model was coded by means of employing the solver equations and C++ programming language. By comparison, the calculation results have quite remarkable consistency with those results calculated by Gasturb 10 which is famous commercial software in aero-engine. The simulation results show that the maximum relative errors of high pressure compressor, turbine inlet temperature and the surge margin of compressor are within 1% and ICV method avoids iterative so the computer's running time is evidently reduced.

[查看全文](#) [查看/发表评论](#) [下载PDF阅读器](#)