[1]冯喜平,秦延涵,李进贤,等.非对称方形尾喷管内流场数值分析与推力特性研究[J].弹箭与制导学报,2009,6:149.

FENG Xiping,QIN Yanhan,LI Jinxian,et al.Numerical Analysis on Inner Flow Field and Thrust Speciality Research of the Asymmetry Quadrate Nozzle[J].,2009,6:149.

点击复制

工具/TOOLS

引用本文的文章/References

下载 PDF/Download PDF(141KB)

立即打印本文/Print Now

非对称方形尾喷管内流场数值分析与 推力特性研究

Title: Numerical Analysis on Inner Flow Field and Thrust Speciality Research of the Asymmetry Quadrate Nozzle

作者: 冯喜平; 秦延涵; 李进贤; 赵胜海
西北工业大学航天学院，西安 710072

Author(s): FENG Xiping; QIN Yanhan; LI Jinxian; ZHAO Shenghai
School of Astronautics, Northwestern Polytechnical University, Xi'an 7 10072, China

关键词: 固体火箭发动机; 非对称方形尾喷管; 数值模拟; 推力特性

Keywords: solid rocket motor; asymmetry quadrate nozzle; numerical simulat ion; thrust speciality

分类号: V435.23

DOI: -

文献标识码: A

摘要: 文中建立了非对称方形尾喷管及传统轴对称尾喷管的物理数学模型，基于N S方程和RNG kε 湍 流模型，对两种尾喷管三维内流场进行了数值分析，研究了非对称方形尾喷管内部流动参数的变化趋势及其 推力特性。结果表明:在相同收敛段、喷管长度和扩张比的条件下，两种喷管内的流动参数变化趋势一致与轴 对称喷管相比，非对称方形尾喷管推力略低，但能够保证喷管的推力性能水平。

Abstract: physical and numerical models were establishedased on N‑S c ontrol equations and RNG k‑εturbulence model， the interior flow fields of the nozzles were analyzed through num erical method， both the flow parameters change trend and thrust speciality of the asymmetry quadrate nozzle were resea rched. The results show that， with the same constrin‑ gency segment， nozzle length and expansion ratio， the change trend o f flow parameters is consistent both the nozzles， and the asymmetry quadrate nozzle has the lower thrust compared w ith the axial‑symmetry nozzlebut the level of its thrust performance can be ensured.

参考文献/REFERENCES

[1] G C Gates著.飞机推进系统技术与设计［M］.陈 大光，译. 北京:航空工业出版社，1992.

[2] Maureen Rowbotham， XRS‑2200 linear aerospike engine:Use of pro‑engineer for determining mass properties ［R］.AIAA 99-2334.

［3］ 覃粒子，王长辉. 三维喷管设计［J］. 推进技术， 2005, 26（6）:499-503.

［4］ Lindblad I A A， Gr 9.nland T A， Cambier J L. A Study of hypersonic after body flo⁻wfields［R］. AIAA 97-2289.

［5］ 王晓栋，乐嘉陵. 入口温度剖面对喷管流场结构的 影响［J］. 推进技术，2002，23（4）:283-286.

［6］ 金捷. 航空发动机排气系统数值模拟技术的初步 研究［J］. 燃气涡轮试验与研究，2001，14（3）: 45-48.

［7］ Hagemann G， Immich H. Flow phenomena in ad⁻vanced rocket nozzles［R］. AIAA 98-3522.