爆炸与冲击
EXPLOSION AND SHOCK WAVES
ISSN1001-1455
CN 51-1148/Q3
主管单位：四川省科学技术协会
主办单位：中国力学学会
四川省力学学会
中物院流体物理研究所

爆炸与冲击 » 2010, Vol. 30 » Issue (3) :295-300 DOI: CNKI:SUN:BZCJ.0.2010-03-013

DCD格式在破碎发射药床两相流内弹道计算中的应用

贠来峰, 芮筱亭, 王国平, 陈涛

南京理工大学;南京军事代表局

Application of DCD scheme to computation of two-phase flow interior ballistics for fractured propellant bed

YUAN Lai-Feng, RUI Xiao-Ting, WANG Guo-Ping, CHEN Tao*

摘要 参考文献 相关文章

Download: PDF (421KB) HTML KB Export: BibTeX or EndNote (RIS) Supporting Info

摘要 利用DCD(dispersion controlled dissipative scheme)格式,提出了一种研究发射装药发射安全性问题的两相流内弹道计算方法。将内弹道气固两相流动力学方程组中与压力有关的项进行变形,实现了用同一种格式对气相和固相统一处理,而无须分别对待,采用DCD格式无须数值粘性和人工滤波,提高了计算精度。实例计算了某榴弹内弹道两相流动力学,计算结果与实验结果吻合较好。把破碎发射药床视为混合装药结构,用DCD格式计算了发射药床不同破碎程度对发射安全性的影响。计算结果表现出了通常计算方法难以反映的破碎发射药床内弹道压力极为剧烈的变化过程和极高的危险膛压。 更多还原

关键词： 流体力学 两相流 发射装药 DCD格式 内弹道 发射安全性 差分格式

Abstract： A new computational method of two-phase flow interior ballistics which can be used to study the launch safety problem of propellant charge is put forward based on the DCD scheme. By rewriting the form of items about pressure in dynamics equation group of gas-solid two-phase flow,the uniform disposal of gas and solids with the same scheme are realized,and it does not need to treat them respectively. It does not need artificial filtering or numerical viscosity while using the DCD scheme,so the computational accuracy is improved. In an instance the two-phase flow interior ballistics of a howitzer is computed,the computational results agree with the test results. The influence of different fracture degree of propellant charge on launch safety is numerically simulated by the DCD scheme,in which fractured propellant charge bed is considered as a mixed charge configuration. The barrel pressure evolvement and dangerous barrel pressure,which are difficult to be reflected by the computational methods,appear in the computational results for interior ballistic of fractured propellant charge bed.

Keywords： fluid mechanics two-phase flow propellant charge DCD scheme interior ballistic launch safety finite difference scheme

Service
把本文推荐给朋友
加入我的书架
加入引用管理器
Email Alert
RSS
作者相关文章
贠来峰
芮筱亭
王国平
陈涛

引用本文:
贠来峰, 芮筱亭, 王国平, 陈涛.DCD格式在破碎发射药床两相流内弹道计算中的应用[J] 爆炸与冲击, 2010,V30(3): 295-300

YUAN Lai-Feng, RUI Xiao-Ting, WANG Guo-Ping, CHEN Tao.Application of DCD scheme to computation of two-phase flow interior ballistics for fractured propellant bed[J] Explosion and Shock Waves, 2010,V30(3): 295-300

链接本文:
http://www.bzycj.cn:8088/Jweb_bzycj/CN/CNKI:SUN:BZCJ.0.2010-03-013 或 http://www.bzycj.cn:8088/Jweb_bzycj/CN/Y2010/V30/I3/295