

ISSN 0459-1879  
CN 11-2062/O3



EI COMPENDEX  
核心期刊

# 力学学报

Chinese Journal of Theoretical and Applied Mechanics

第 52 卷 第 5 期 Vol. 52 No. 5

2020

力学学报

二〇二〇年九月

第五十二卷第五期

中国力学学会·中国科学院力学研究所  
主办

力学学报

力学学报  
期刊社  
出版



中国力学学会  
中国科学院力学研究所  
力学学报期刊社  
出版

万方数据



# 力学学报 (双月刊)

Chinese Journal of Theoretical and  
Applied Mechanics

1957 年 创刊

2020 年

第 52 卷 第 5 期

## 目 次

### 研究综述

超弹性材料本构关系的最新研究进展 ..... 彭向峰 李录贤 (1221)

### 热应力专题

热应力专题序 ..... 王 骥 杜建科 (1233)

磁-电-弹性半空间在轴对称热载荷作用下的三维问题研究 ..... 胡克强 高存法 仲 政 Chen Zengtao (1235)

考虑材料温度相关性的二维轮轨弹塑性滑动接触温升分析 ..... 伏培林 丁 立 赵吉中 张 旭 阚前华 王 平 (1245)

超短激光脉冲加热薄板的广义热弹扩散问题 ..... 李 妍 何天虎 田晓耕 (1255)

考虑应变率的广义压电热弹理论及其应用 ..... 李吉伟 何天虎 (1267)

板中热弹波传播:一种改进的勒让德多项式方法 ..... 王现辉 李方琳 刘宇建 陈会涛 禹建功 (1277)

一维准晶功能梯度层合圆柱壳热电弹性精确解 ..... 李 杨 秦庆华 张亮亮 高 阳 (1286)

多个局部温度载荷下压电半导体纤维杆的压电电子学行为分析 ..... 程若然 张春利 (1295)

### 流体力学

基于深度学习技术的激波风洞智能测力系统研究 ..... 汪运鹏 杨瑞鑫 聂少军 姜宗林 (1304)

基于 Navier-Stokes 方程残差的隐式大涡模拟有限元模型 ..... 陈林烽 (1314)

强吸气旋转圆筒壁面湍流边界层建模及计算 ..... Ievgen Mochalin 林静雯 蔡建程 Volodymyr Brazhenko 鄂世举 (1323)

全局方向模板对非结构有限体积梯度与高阶导数重构的影响 ..... 孔令发 董义道 刘 伟 (1334)

近距离下射流冲击平板PIV 实验研究 ..... 胡建军 朱 晴 王美达 金瑶兰 王思民 孔祥东 (1350)

模拟 Chelyabinsk 小行星进入的烧蚀实验 ..... 罗 跃 王 磊 党雷宁 刘进博 张 军 柳 森 (1362)

基于车身绕流的低雷诺数湍流模型改进研究 ..... 强光林 杨 易 陈 阵 谷正气 张 勇 (1371)

### 固体力学

Mindlin 矩形微板的热弹性阻尼解析解 ..... 马航空 周晨阳 李世荣 (1383)

三维切口/裂纹结构的扩展边界元法分析 ..... 李 聪 牛忠荣 胡宗军 胡 斌 (1394)

考虑平均应力的同频拉扭多轴高周疲劳寿命评价方法 ..... 李 静 佟晓龙 杨 烨 仇原鹰 (1409)

连续纤维增强复合材料结构基频最大化设计 ..... 程长征 卞光耀 王 选 龙 凯 李景传 吴乔国 (1422)

一种基于 Neumann 级数的区间有限元方法 ..... 伍鹏革 倪冰雨 姜 潮 (1431)

WFeNiMo 高熵合金动态力学行为及侵彻性能研究 ..... 陈海华 张先锋 熊 玮 刘 闯 魏海洋 汪海英 戴兰宏 (1443)

### 动力学与控制

燃料消耗下充液航天器等效动力学建模与分析 ..... 刘 峰 岳宝增 马伯乐 申云峰 (1454)

空间机械臂柔性捕获机构建模与实验研究 ..... 李海泉 梁建勋 吴 爽 刘 茜 张文明 (1465)

一类 Duffing 型系统的不动点混沌和 Fold/Fold 簇发现象及机理分析 ..... 陈娅昵 孟文静 钱有华 (1475)

自抗扰控制框架下的摩擦力振动分析 ..... 朴敏楠 王 穗 周亚靖 孙明玮 张新华 陈增强 (1485)

具有刚性间隙约束输流管的碰撞振动 ..... 王乙坤 王 琳 倪 樵 杨 涂 刘德政 秦 涛 (1498)

### 生物、工程及交叉力学

汽车行驶诱发地表振动的解析研究 ..... 王立安 赵建昌 王作伟 (1509)

基于 t 准则的各向异性强度准则及变换应力法 ..... 万 征 孟 达 (1519)

基于内聚力模型的高速水流聚脲基涂层剥离破坏模型研究 ..... 李炳奇 张振宇 李 斌 刘小楠 杨旭辉 (1538)

# Chinese Journal of Theoretical and Applied Mechanics

(Bimonthly)

Vol. 52, No. 5, 2020

## CONTENTS

### Research Review

State of the art of constitutive relations of hyperelastic materials ..... Peng Xiangfeng Li Luxian (1221)

### Theme Articles on Thermal Stresses

- Preface of theme articles on thermal stresses ..... Wang Ji Du Jianke (1233)  
Three-dimensional analysis of a magnetoelastic half-space under axisymmetric temperature loading ..... Hu Keqiang Gao Cunfa Zhong Zheng Chen Zengtao (1235)  
Frictional temperature analysis of two-dimensional elasto-plastic wheel-rail sliding contact with temperature-dependent material properties ..... Fu Peilin Ding Li Zhao Jizhong Zhang Xu Kan Qianhua Wang Ping (1245)  
A generalized thermoelastic diffusion problem of thin plate heated by the ultrashort laser pulses ..... Li Yan He Tianhu Tian Xiaogeng (1255)  
A generalized piezoelectric-thermoelastic theory with strain rate and its application ..... Li Jiwei He Tianhu (1267)  
Thermoelastic wave propagation in plates: an improved legendre polynomial approach ..... Wang Xianhui Li Fanglin Liu Yujian Chen Huitao Yu Jiangong (1277)  
Exact thermo-electro-elastic solution of functionally graded multilayered one-dimensional quasicrystal cylindrical shells ..... Li Yang Qin Qinghua Zhang Liangliang Gao Yang (1286)  
Analysis of the piezotronic effect of a piezoelectric semiconductor fiber under multiple local temperature loadings ..... Cheng Ruoran Zhang Chunli (1295)

### Fluid Mechanics

- Deep-learning-based intelligent force measurement system using in a shock tunnel ..... Wang Yunpeng Yang Ruixin Nie Shaojun Jiang Zonglin (1304)  
A residual-based unresolved-scale finite element modelling for implicit large eddy simulation ..... Chen Linfeng (1314)  
Modelling and calculation of the turbulent boundary layer on a rotating cylinder surface with strong suction ..... Ievgen Mochalin Lin Jingwen Cai Jiancheng Volodymyr Brazhenko E Shiju (1323)  
The influence of global-direction stencil on gradient and high-order derivatives reconstruction of unstructured finite volume methods ..... Kong Lingfa Dong Yidao Liu Wei (1334)  
PIV measurement of close impinging jet on flat plate ..... Hu Jianjun Zhu Qing Wang Meida Jin Yaolan Wang Simin Kong Xiangdong (1350)  
Arcjet ablation experiment to simulate the Chelyabinsk asteroid entry ..... Luo Yue Wang Lei Dang Leining Liu Jinbo Zhang Jun Liu Sen (1362)  
Research on improvements of LRN turbulence model based on flow around automobile body ..... Qiang Guanlin Yang Yi Chen Zhen Gu Zhengqi Zhang Yong (1371)

### Solid Mechanics

- Analytical solution of thermoelastic damping in rectangular Mindlin micro plates ..... Ma Hangkong Zhou Chenyang Li Shirong (1383)  
Analysis of 3-D notched/cracked structures by using extended boundary element method ..... Li Cong Niu Zhongrong Hu Zongjun Hu Bin (1394)  
A multiaxial high cycle fatigue life prediction model considering the effect of mean stress for tension-torsion loadings with same frequency ..... Li Jing Tong Xiaolong Yang Shuo Qiu Yuanying (1409)  
Fundamental frequency maximization design for continuous fiber-reinforced composite structures ..... Cheng Changzheng Bian Guangyao Wang Xuan Long Kai Li Jingchuang Wu Qiaoguo (1422)  
An interval finite element method based on the Neumann series expansion ..... Wu Pengge Ni Bingyu Jiang Chao (1431)  
Dynamic mechanical behavior and penetration performance of WFeNiMo high-entropy alloy ..... Chen Haihua Zhang Xianfeng Xiong Wei Liu Chuang Wei Haiying Wang Haiying Dai Lanhong (1443)

### Dynamics, Vibration and Control

- Equivalent dynamics modeling and analysis of liquid-filled spacecraft with fuel consumption ..... Liu Feng Yue Baozeng Ma Bole Shen Yunfeng (1454)  
Dynamics modeling and experiment of a flexible capturing mechanism in a space manipulator ..... Li Haiquan Liang Jianxun Wu Shuang Liu Qian Zhang Wenming (1465)  
Fixed point chaos and Fold/Fold bursting of a class of Duffing systems and the mechanism analysis ..... Chen Yani Meng Wenjing Qian Youhua (1475)  
Analysis of friction induced vibration under the active disturbance rejection control framework ..... Piao Minnan Wang Ying Zhou Yajing Sun Mingwei Zhang Xinhua Chen Zengqiang (1485)  
Vibro-impact dynamics of pipe conveying fluid subjected to rigid clearance constraint ..... Wang Yikun Wang Lin Ni Qiao Yang Mo Liu Dezheng Qin Tao (1498)

### Biomechanics, Engineering and Interdisciplinary Mechanics

- Analytical study on ground vibration induced by moving vehicle ..... Wang Li'an Zhao Jianchang Wang Zuowei (1509)  
Anisotropic strength criterion based on t criterion and the transformation stress method ..... Wan Zheng Meng Da (1519)  
Study on debonding failure model of polyurea-based coating with high velocity water flow based on cohesive zone model ..... Li Bingqi Zhang Zhenyu Li Bin Liu Xiaonan Yang Xuhui (1538)