



中国科技核心期刊(中国科技论文统计源期刊)  
《中国学术期刊(网络版)》全文收录期刊  
辽宁省一级期刊

ISSN  
CODEN



QK1918676

CODEN SDXZC5

# 沈阳大学学报

自然科学版 第31卷第2期

JOURNAL OF SHENYANG UNIVERSITY

Natural Science Vol.31 No.2

2

2019

中国·沈阳  
SHENYANG CHINA

# 沈阳大学学报(自然科学版)

Shenyang Daxue Xuebao (Ziran Kexue Ban)

第31卷 第2期

2019年4月

## 目次

### 【材料与化工】

- 高锰铝青铜表面激光熔覆铜基合金的耐蚀性能  
..... 贺春林,付馨莹,陈宏志,霍嘉翔,房博文,冯海东,马国峰,王建明(87)
- 正癸胺插层层状钛硅酸盐制备参数 ..... 赵大洲(92)

### 【生物与环境】

- 用混凝-微电解预处理工艺处理豆制品废水  
..... 赵晓旭,张忠懿,牛青,鄢继翱,郭智垒,余艳祺,冯如萍,宋雪英(95)
- 18种植物乙醇提取物对二斑叶螨的杀螨活性 ..... 郭宇俊,韩俊艳,李志强,杨诗博(101)

### 【信息与控制】

- 混合亚启发式算法求解带有热量损失的单吊机调度 ..... 谢 谢,周 莉,郑勇跃(107)
- 基于 STM32 的指纹识别系统设计 ..... 张 乐,王 悦(113)
- 基于深度学习的人工智能医疗应用与存在的问题 ..... 王海洲,王 冠(118)
- 基于有界理性的非线性寡头动态价格博弈 ..... 董 海,任 鹤,乔若真(122)
- 高校教学网络终端准入控制系统设计 ..... 陆立华(128)

### 【建筑与土木】

- 冻融条件下轴压加固柱的承载力计算方法 ..... 周 乐,田佳茗(134)
- 装配式宽幅连续梁桥支座受力研究 ..... 鄢稳定,郭凤俊,时元绪,邓淇元,鄢晓光(141)
- GNSS 测定地球自转参数精度分析 ..... 郭忠臣,姚 翔(146)

### 【数学与物理】

- 泛函积分 Cauchy 中值定理“中间点”的渐近性 ..... 张树义,张芯语,丛培根(150)
- 灰色关联分析方法的改进与应用——以中俄贸易与政治的关联分析为例  
..... 郝 乐,李蓓蓓,杨 鹤(154)
- 具有不确定参数的新混沌系统的参数辨识与自适应同步 ..... 郑 莉,孙常春(160)
- 非标准有限差分法求解薛定谔方程 ..... 刘明鼎,林 鑫,张艳敏(165)
- $k$  元  $n$  立方体的条件容错强 Menger 边连通性 ..... 翟登鑫(168)
- 喜报 ..... (封2,封3)

本期基本参数: CN21-1583/N \* 1988 \* b \* A4 \* 88 \* zh \* P \* ¥ 10.00 \* 1000 \* 17 \* 2019-04

执行编辑: 李 艳

英文审校: 李 艳



# JOURNAL OF SHENYANG UNIVERSITY (NATURAL SCIENCE)

Volume 31 Number 2

April 2019

## CONTENTS

### 【Materials Science and Chemical Industry】

- Corrosion Resistance of Laser-Clad Copper-Based Alloy on High Manganese Aluminum Bronze Surface  
..... HE Chunlin, FU Xinying, CHEN Hongzhi, HUO Jiaxiang,  
FANG Bowen, FENG Haidong, MA Guofeng, WANG Jianming (112)
- Preparation Parameters of N-Decylamine Intercalated Layered Titanosilicate ..... ZHAO Dazhou (94)

### 【Biological and Environmental Engineering】

- Treatment of Soybean Products Wastewater by Coagulation-Micro-Electrolysis Pretreatment Process  
..... ZHAO Xiaoxu, ZHANG Zhongyi, NIU Qing, YAN Ji'ao, GUO Zhilei,  
YU Yanbin, FENG Ruping, SONG Xueying (100)
- Acaricidal Activities of Ethanol Extracts of 18 Plants on *Tetranychus urticae* Koch  
..... GUO Yujun, HAN Junyan, LI Zhiqiang, YANG Shibo (106)

### 【Information and Control】

- A Hybrid Sub-Heuristic Algorithm for Solving a Single Crane Scheduling Problem with Heat Loss  
..... XIE Xie, ZHOU Li, ZHENG Yongyue (112)
- Design of Fingerprint Identification System Based on STM32 ..... ZHANG Le, WANG Yue (117)
- Application and Existing Problems of Artificial Intelligence Medical Based on Deep Learning  
..... WANG Haizhou, WANG Guan (121)
- Dynamic Price Game in Nonlinear Duopoly Model with Bounded Rationality  
..... DONG Hai, REN He, QIAO Ruozhen (164)
- Design of Terminal Access Control System for Teaching Network in Colleges and Universities ..... LU Lihua (133)

### 【Architecture and Civil Engineering】

- Calculation Method of Bearing Capacity of Axially Reinforced Columns Under Freezing and Thawing Conditions  
..... ZHOU Le, TIAN Jiaming (140)
- Bearing Force of Assembled Wide Continuous Girder Bridges  
..... YAN Wending, GUO Fengjun, SHI Yuanxu, DENG Qiyan, WU Xiaoguang (145)
- Precision Analysis of Earth Rotation Parameters Determined by GNSS Observations  
..... GUO Zhongchen, YAO Xiang (149)

### 【Mathematics and Physics】

- Asymptotic Behavior of "Intermediate Point" for Functional Integrals Cauchy Mean Value Theorem  
..... ZHANG Shuyi, ZHANG Xinyu, CONG Peigen (153)
- Improvement and Application of Grey Relational Analysis Method: A Case Study of Relationship  
Between Sino-Russian Trade and Politics ..... HAO Le, LI Beibei, YANG He (159)
- Parameter Identification and Adaptive Synchronization of a New Chaotic System with Uncertain Parameters  
..... ZHENG Li, SUN Changchun (164)
- Nonstandard Finite Difference Method for Solving Schrödinger Equation  
..... LIU Mingding, LIN Xin, ZHANG Yanmin (172)
- Strong Menger Edge-Connectivity with Conditional Fault Tolerance of  $k$ -Ary  $n$ -Cubes ..... ZHAI Dengxin (172)

**Glad Tidings** ..... (Inside Front Cover, Inside Back Cover)

Serial Parameters: CN21-1583/N \* 1988 \* b \* A4 \* 88 \* zh \* P \* ¥10.00 \* 1000 \* 17 \* 2019-04

The English Reviser: Li Yan



封面设计: 刘 洋

沈阳大学学报 (自然科学版)

Shenyang Daxue Xuebao (Ziran Kexue Ban)

(双月刊, 1988年创刊)

第31卷 第2期 2019年4月

Journal of Shenyang University (Natural Science)

J Shenyang Univ (Nat Sci)

(Bimonthly, Started in 1988)

Vol. 31 No. 2 Apr. 2019

主办单位: 沈阳大学

主 编: 原忠虎

副 主 编: 程 杰, 孙 立, 李 艳

编辑出版: 《沈阳大学学报》编辑部

通讯地址: 沈阳市大东区联合路54号

邮政编码: 110041

电话号码: 024-62268727

传真号码: 024-62268727

电子信箱: sydxxb@163.com

网络地址: <http://sydxxb.paperopen.com>

印刷单位: 沈阳师大彩色印刷有限公司

发行范围: 公开发行

国内发行: 辽宁省邮政公司报刊发行公司

邮发代码: 8-154

Sponsor: Shenyang University

Editor in Chief: YUAN Zhonghu

Deputy Editor in Chief: CHENG Jie, SUN Li, LI Yan

Edited and Published by: Editorial Department of Journal of  
Shenyang University

Add: No.54, Lianhe Road, Dadong District, Shenyang, China

Post Code: 110041

Tel: 86-24-62268727

Fax: 86-24-62268727

E-mail: sydxxb@163.com

Website: <http://sydxxb.paperopen.com>

Printing Units: Shenyang Normal University Color Printing Co., Ltd.

Issuing Scope: Public Issue

Postal Distributing Code: 8-154

ISSN 2095-5456

CODEN SDXZC5 杜威码: 500

LC# AS452.S5385; Dewey#:500

ISSN 2095-5456

国内定价: 10.00元/期, 60.00元/卷

CN21-1583/N



9 77209 545456  
万方数据