



一门科学只有在成功地运用数学时，  
才算达到了真正完善的地步。

——马克思

ISSN 1000-0984  
CODEN SSHRE8

# 数学的实践与认识

MATHEMATICS

IN PRACTICE AND THEORY

第四十二卷

第10期

Vol. 42

No. 10

2012

中国数学会会刊

中国科学院数学与系统科学研究院主办

科学出版社出版

# MATHEMATICS IN PRACTICE AND THEORY

2012 Vol.42 No.10

## Contents

### Managed Science

- The Scientific Determination of an Indicant to Evaluate the Comprehensive Quality of Normal University Students ..... MA Jian-hua(1)  
Empirical Analysis of Consumption Ability and Trend of Residents Based on Consumption Function Model ..... HE Man-xi, WANG Qin(6)  
Empirical Test on Technology Efficiency of Human Capital Structure in China Based on Stochastic Frontier ..... YAN min, WANG Wei-guo (11)  
Quantitative Analysis of the Promoting Effect of Tourism on Tibet Economy ..... MA Shou-chun, MA Zi-qi(19)  
A Study on Business Model Innovation based on Extension Transformation ——Take the Innovation of Electric Vehicle as an Example ..... LIU Yan-bin, LI Xing-sen, YUAN Ping(25)  
Construction of Social Security Crisis Warning Model for Xinjiang Region Based on Fuzzy Analytical Hierarchy Process ..... LIU Xuan-lin, ZHAO Hong(32)  
Analysis of the Influential Factors on Pre-IPO Investment of Private Equity Funds in China ..... ZHAO Zhong-qiu, MA Shuang(38)  
Counterfactual Decomposition of the Income Gap between the Urban and the Rural in China ..... LI Hong-mei(46)  
Empirical Analysis of the Effectiveness of Refined Oil Pricing in China ..... ZHAO Lu-tao, FENG Ke-liang, YAO Yun-fei, WU Gang(55)

### Engineering

- Mathematical Method for Measurement of the Blending Ratio And Its Computation of Corresponding Genetic Algorithm ..... ZHANG Li, JIN Jian, CHEN En-shui, TAO Cheng, FAN Zhen-bin (62)  
Arithmetic Stability Analysis of Extreme Risk Evaluation Based on Monte Carlo Simulation Method ..... LIU Dong-liang, XU Hao-jun, CAI Jun, GUO Hui (68)  
Short-term Forecasting Using Seasonal ARIMA Models in Power System ..... TANG Yan, WANG Fu-lin, WANG Ji-quan(74)  
A Study of Decision Making on Location of Aircraft Manufacturing Material Distribution Center on Plateau Area Based on Two-Tuple Linguistic ..... CHEN Gai-kai, WANG Ying, ZHANG Yi(81)  
Forecast and Analysis of the Market Share of the China Aviation market ..... CHEN Hong-yu, XIA Le-tian, CHEN Xiao-di(86)  
A Method for Estimating Parameter of Modified Initial Value Grey Verhulst Model ..... HE Xia, LIU Wei-feng(93)

### Applications

- Inverse Suboptimal Control of Polytopic Nonlinear Systems ..... MO Li-po, XIONG Ling-chun(99)  
The Adjacent Vertex Strongly Distinguishing VI-total Colorings of Mycielski's Graphs ..... XIE Yan(107)  
A Job Scheduling Algorithm Based on Artificial Bee Colony in Cloud Computing ..... YANG Hai-jun (115)

### Research

- New Families of Modified Two-step Chebyshev-halley Methods with Sixth-order Convergence ..... TIAN Ya-fang, ZHOU Su-jing, WANG Xia (121)  
Adjacent Vértext-distinguishing E-total Coloring on the Multiple Join Graph of Wheel and Path ..... ZHANG Wei, ZHANG Li, LI Mu-chun(128)  
Stability Analysis of Fractional Differential Equations with Miller-ross Sequential Derivative in Caputo Sense ..... QIAN De-liang, LI Chang-pin(133)  
Isomorphisms and Simple Quality of a Infinite Dimensional Lie Algebra ..... YU De-min, MEI Chao-qun, ZHANG Zai-yun(140)  
The Extremal Problem of Quasi-comformal Extension ..... SUN Xiao-kang, YAN Qing(145)  
An Upper Bound for the Adjacent Vertex-distinguishing VE-Total Chromatic Number of a Graph ..... LIU Xin-sheng, WANG Zhi-qiang(151)  
Additive Maps Completely Preserving Involution Between Standard Operator Algebras ..... HUANG Li, LIU Min (156)  
The Extension of the Twelve-Point Sphere Theorem for a Tetrahedron ..... WANG Qi-zhi, WANG Dong-sheng (163)  
Fuzzy Structuring Element Method for  $n$ th-order Fuzzy Differential Equation ..... WANG Lei (168)  
Gray Bi-matrix Game and Its Equilibrium Solution ..... XU Hua-feng, LI Ling-ling, FANG Zhi-geng(174)  
Two Upper Bounds for the Antivariance Numbers ..... YAO Ming, YAO Bing, XIE Jian-min, CHEN Wen-jing (180)  
The Alternating Group Explicit Scheme for the Fourth-order Parabolic Equation with Diffusion ..... GUO Ge-yang, LIU Bo(185)  
High Accuracy Analysis of the Nonconforming Quasi-wilson Element Solution to Quasi-Linear Hyperbolic Equations ..... WU Zhi-qin, SHI Dong-wei, WANG Fen-ling, SHI Dong-yang (192)

- The Existence of Positive Solutions for the Second-order Equation Systems of Multi-Point Boundary Value Problems with Dependence on the First Order Derivative ..... SUO Xiu-yun, GUO Shao-cong, GUO Yan-ping, XU Yan-ling(199)  
Stability Analysis of an SEIA Epidemic Models with Vertical Transmission ..... WANG Juan, ZHAO Ying-li (205)

### Teaching Field

- The Mean Value Function for the Second Integral ..... FAN Shou-fang (211)  
Uniform Persistence for a New Predator-prey System ..... BAO Lei (218)  
Single Machine Scheduling Problem to Minimize the Number of Tardy Jobs with Job Processing Time being Piecewise Linear Function of its Start Time ..... JIN Ji(222)  
Two Mappings Associating with GA-convex Functions ..... SHI Tong-ye, WU Han(230)  
Nontrivial Solutions of a Discrete Problem with Resonance ..... YIN Li-li, LIU Jin-sheng(238)  
Monotone Iterative Method for Differential Equations with Nonlinear Boundary Value Conditions ..... WEI Lan-ge, TIAN Shu-huan, WANG Shu-yan, ZHOU He-yue(244)  
The Equivalence of the Convergence Between Modified Mann and Ishikawa Iterations in Banach Spaces ..... ZHANG Jian, FAN Zhen-yao, ZHAI Quan-li(251)  
Applications of the Mathematical Model  $\delta(n, d, k)$  in Selection of Athletes ..... YUAN Ru-jian, KANG Li-kun (257)  
The Application of Support Vector Regression and Multi-wavelet Transform in the Digital Image Watermarking Algorithm ..... QIAO Hai-ying, MIAO Li-feng, YI Bo(260)  
Pooling Designs from the n-dimensional Projective Geometry over Finite Field ..... ZHANG Hai-yan, GAO Jian-ping (265)

# 数学的实践与认识

2012年第42卷第10期

## 目 次

### 管理科学

- 高师院校学生综合素质评价指标的科学确定 ..... 马建华(1)  
基于消费函数模型的居民消费能力与趋势的实证分析 ..... 何满喜, 王勤(6)  
人力资本结构对我国技术效率的影响——基于随机前沿生产函数的实证分析 ..... 颜敏, 王维国(11)  
旅游业促进西藏经济发展的量化分析 ..... 马守春, 马子琦(19)  
基于可拓变换的商业模式创新研究——以电动汽车商业模式创新为例 ..... 刘艳彬, 李兴森, 袁平(25)  
基于模糊层次综合评价法的新疆社会安全危机预警模型的建构 ..... 刘选林, 赵红(32)  
私募股权基金在华 Pre-IPO 投资的影响因素分析 ..... 赵中秋, 马爽(38)  
我国城乡居民收入差距的反事实因素分解 ..... 李红梅(46)  
中国成品油定价机制的实证分析 ..... 赵鲁涛, 冯可梁, 姚云飞, 吴刚(55)

### 工 程

- 混纺比测定中的数学方法及其遗传算法实现 ..... 张立, 金健, 陈恩水, 陶晨, 凡震彬(62)  
基于 Monte Carlo 仿真的小概率事件评估算法稳定性研究 ..... 刘东亮, 徐浩军, 蔡军, 郭辉(68)  
基于季节 ARIMA 模型的电力系统负荷短期预测 ..... 汤岩, 王福林, 王吉权(74)  
基于二元语义的高原地区航材配送中心选址决策研究 ..... 陈盖凯, 王瑛, 张毅(81)  
中国航空市场占有率为预测与分析 ..... 陈宏宇, 夏乐天, 陈小弟(86)  
初值修正灰色 Verhulst 模型的参数估计 ..... 何霞, 刘卫锋(93)

### 应 用

- 凸多面体非线性系统的逆次优控制 ..... 莫立坡, 熊令纯(99)  
Mycielski 图的邻点强可区别的 VI- 全染色 ..... 谢雁(107)  
云计算环境下人工蜂群作业调度算法设计 ..... 杨海军(115)

### 研 究

- 几类改进的新的两步六阶 Chebyshev-Halley 方法 ..... 田亚芳, 周素静, 王霞(121)  
轮与路的多重联图的邻点可区别 E- 全染色 ..... 张威, 张荔, 李沐春(128)  
基于 Caputo 导数的 Miller-Ross 序列导数微分方程的稳定性分析 ..... 钱德亮, 李常品(133)  
一类无限维李代数的同构与单性 ..... 余德民, 梅超群, 张再云(140)  
拟共形映射的极值问题 ..... 孙小康, 颜青(145)  
图的邻点可区别 VE- 全色数的一个上界 ..... 刘信生, 王志强(151)  
标准算子代数上完全保对合性的叮加映射 ..... 黄丽, 刘敏(156)  
四面体的十二点二次曲面 ..... 王奇志, 王东生(163)  
 $n$  阶线性模糊微分方程的结构元解法 ..... 王磊(168)  
灰色双矩阵博弈模型及其均衡解 ..... 徐华锋, 李玲玲, 方志耕(174)  
关于反平均数的 2 个上界 ..... 姚明, 姚兵, 谢建民, 陈文静(180)  
带扩散项四阶抛物方程一类新的交替分组显格式 ..... 郭阁阳, 刘播(185)  
拟线性双曲方程类 Wilson 非协调元的高精度分析 ..... 吴志勤, 石东伟, 王芬玲, 石东洋(192)  
含一阶导数的二阶微分方程组多点边值问题正解的存在性 ..... 索秀云, 郭少聪, 郭彦平, 许艳玲(199)  
具有垂直传染的 SEIA 传染病模型的稳定性 ..... 王娟, 赵英丽(205)

### 教学园地

- 第二积分中值函数 ..... 樊守芳(211)  
一类新的捕食模型的一致持久 ..... 鲍磊(218)  
加工时间是开工时间线性分段函数的单机总误工问题 ..... 金霁(222)  
与 GA- 凸函数有关的两个函数 ..... 时统业, 吴涵(230)  
离散共振问题的非平凡解 ..... 尹莉莉, 刘进生(238)  
微分方程非线性边值问题的单调迭代方法 ..... 魏兰阁, 田淑环, 王淑燕, 周和月(244)  
Banach 空间中修正的 Mann 迭代与 Ishikawa 迭代收敛的等价性 ..... 张健, 范振耀, 翟全礼(251)  
数学模型  $\delta(n, d, k)$  在选拔运动员中的应用 ..... 原儒建, 康丽坤(257)  
支持向量回归机和多小波变换在数字图像水印算法中的应用 ..... 乔海英, 苗利峰, 易波(260)  
 $n$  维有限射影几何上的 Pooling 设计 ..... 张海燕, 高建平(265)