

CHINESE JOURNAL OF MECHANICAL ENGINEERING®

中国机械工程学报



CJME Vol. 29, No. **1**
January 2016

CHINESE JOURNAL OF MECHANICAL ENGINEERING

Vol. 29, No. 1, 2016

Contents

Mechanism and Robotics

- 1 **Over-Constraints and a Unified Mobility Method for General Spatial Mechanisms**
 Part 2: Application of the Principle
 LU Wenjuan, ZENG Daxing, and HUANG Zhen
- 11 **Dynamic Bending of Bionic Flexible Body Driven by Pneumatic Artificial**
 Muscles(PAMs) for Spinning Gait of Quadruped Robot
 LEI Jingtao, YU Huangying, and WANG Tianmiao
- 21 **Evaluation Method on Steering for the Shape-shifting Robot**
 in Different Configurations
 CHANG Jian, LI Bin, WANG Chong, ZHENG Huaibing, and LI Zhiqiang
- 33 **Kinetostatic Modeling and Analysis of an Exechon Parallel Kinematic**
 Machine(PKM) Module
 ZHAO Yanqin, JIN Yan, and ZHANG Jun
- 45 **Biped 4R2C Six-bar Mechanism with Inner and Outer Feet**
 LIU Chao, WANG Hao, and YAO Yan-an
- 56 **Algebraic Solution for the Forward Displacement Analysis**
 of the General 6-6 Stewart Mechanism
 WEI Feng, WEI Shimin, ZHANG Ying, and LIAO Qizheng

Advanced Manufacturing and Intelligence Materials

- 63 **Optimization of the Dressing Parameters in Cylindrical Grinding Based**
 on a Generalized Utility Function
 ALEKSANDROVA Irina
- 74 **Welding Deviation Detection Algorithm Based on Extremum**
 of Molten Pool Image Contour
 ZOU Yong, JIANG Lipai, LI Yunhua, XUE Long, HUANG Junfen, and HUANG Jiqiang
- 84 **Friction Behavior of Magnetorheological Fluids with Different Material Types**
 and Magnetic Field Strength
 ZHANG Peng, LEE Kwang-Hee, and LEE Chul-Hee
- 91 **Fabrication of Nanoscale Step Height Structure Using Atomic Layer Deposition**
 Combined with Wet Etching
 WANG Chenying, YANG Shuming, JING Weixuan, REN Wei, LIN Qijing, ZHANG Yijun,
 and JIANG Zhuangde

Experiment, Simulation and Calculation

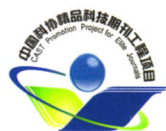
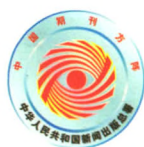
- 98 **Voronoi Based Discrete Least Squares Meshless Method for Heat Conduction Simulation in Highly Irregular Geometries**
LABIBZADEH Mojtaba
- 112 **3D Two-way Coupled TEHD Analysis on the Lubricating Characteristics of Thrust Bearings in Pump-turbine Units by Combining CFD and FEA**
ZHAI Liming, LUO Yongyao, WANG Zhengwei, and LIU Xin
- 124 **Dynamic Topology Multi Force Particle Swarm Optimization Algorithm and Its Application**
CHEN Dongning, ZHANG Ruixing, YAO Chengyu, and ZHAO Zheyu
- 136 **Influence of Magnetic Reluctances of Magnetic Elements on Servo Valve Torque Motors**
LIU Changhai and JIANG Hongzhou
- 145 **Load Reduction Test Method of Similarity Theory and BP Neural Networks of Large Cranes**
YANG Ruigang, DUAN Zhibin, LU Yi, WANG Lei, and XU Gening

Dynamics and Vehicle Engineering

- 152 **A Hybrid Approach to Modeling and Control of Vehicle Height for Electronically Controlled Air Suspension**
SUN Xiaoqiang, CAI Yingfeng, WANG Shaohua, LIU Yanling, and CHEN Long
- 163 **Four-Beam Model for Vibration Analysis of a Cantilever Beam with an Embedded Horizontal Crack**
LIU Jing, ZHU Weidong, CHARALAMBIDES Panos G, SHAO Yimin, XU Yongfeng, WU Kai, and XIAO Huifang
- 180 **Characteristic of Torsional Vibration of Mill Main Drive Excited by Electromechanical Coupling**
ZHANG Yifang, YAN Xiaoqiang, and LIN Qihui
- 188 **Simulation and Experiment for Oxygen-enriched Combustion Engine Using Liquid Oxygen to Solidify CO₂**
LIU Yongfeng, JIA Xiaoshe, PEI Pucheng, LU Yong, YI Li, and SHI Yan

Measurement, Fault Diagnosis and Signal Processing

- 195 **Multi-objective Optimal Design of High Frequency Probe for Scanning Ion Conductance Microscopy**
GUO Renfei, ZHUANG Jian, MA Li, LI Fei, and YU Dehong
- 204 **Improved CICA Algorithm Used for Single Channel Compound Fault Diagnosis of Rolling Bearings**
CHEN Guohua, QIE Longfei, ZHANG Aijun, and HAN Jin
- 212 **Measurement Uncertainty Evaluation of Conicity Error Inspected on CMM**
WANG Dongxia, SONG Aiguo, WEN Xiulan, XU Youxiong, and QIAO Guifang



CHINESE JOURNAL OF MECHANICAL ENGINEERING

中国机械工程学报

(Bimonthly, Started in 1988)

Vol. 29, No. 1, January 2016

Responsible Department China Association for Science and Technology

Sponsored by Chinese Mechanical Engineering Society

Associated to IFToMM

Chief Editor SONG Tianhu

Regional Associate Editor CECCARELLI Marco, CHENG Kai, GAO Wei, MCCARTHY J Michael, ZHANG Liangchi, and ZUO Mingjian

Executive Chief Editor WANG Shuqin

Deputy Chief Editor LIANG Fujun

Executive Editor LIU Dan

Edited by Editorial Office of Chinese Journal of Mechanical Engineering

Address: 22 Baiwanzhuang Dajie, Beijing 100037, China

Tel: +86-10-88379909

Fax: +86-10-68994557

http: //www.cjmenet.com

E-mail: cjme@cmes.org

Copyright © Chinese Mechanical Engineering Society and
Springer-Verlag Berlin Heidelberg 2016

Printed by Beijing BOHS Colour Printing Co., Ltd.

Subscriptions in China Subscriptions are available at post offices throughout China
Postal Code: 2-377
Subscription Price in China: ¥ 100

Coverage in Abstracting & Indexing (A&I) Services: Science Citation Index Expanded (SciSearch), Journal Citation Reports/
Science Edition, SCOPUS, INSPEC, Zentralblatt Math, Chemical Abstracts Service (CAS), Google Scholar, CSA, Chinese
Science Citation Database, Earthquake Engineering Abstracts, EI-Compendex, OCLC, SCImago, Summon by ProQuest

Online Submission

For enquiries relating to the submission of articles (including electronic submission where available), please visit [http: //www.editorialmanager.com/cjme](http://www.editorialmanager.com/cjme), www.cjmenet.com, or www.springer.com/10033

ISSN 1000-9345



9 771000 934169