

# Contents

## Volume 1

<b>Design of Quantum Dots for Rolling Bearing Inner Ring-Cage Thermal Monitoring</b> . . . . .	1
Pan Zhang, Bei Yan, Ke Yan, Jun Hong and Yongsheng Zhu	
<b>Planar Helix Driving Contact Curve Line Gear Mechanism</b> . . . . .	11
Yangzhi Chen and Xiongdun Xie	
<b>Research on Yacht Design Method Based on Game Engine</b> . . . . .	23
Fuyong Liu, Chaohe Chen, Guoye Long, Guanlin Li and Zhijie Ren	
<b>Rigid-Flexible Coupling Dynamic Modeling of a Tower Crane with Long Flexible Boom</b> . . . . .	39
Xuyang Cao, Yue Yang, Wenjun Wang and Zhenhua Gu	
<b>Study on Piezoelectric Energy Collector with Different Section Shape</b> . . . . .	59
Xia Li, Haigang Tian, Yadong Dong and Yuechen Duan	
<b>The Mechanical Assembly Precision Analysis Considering Actual Working Condition</b> . . . . .	73
Shaobo Jin, Fengxia Zhao, Shuo Sun and Linna Zhang	
<b>A Gear Mesh Dynamic Model for Analyzing the Nonlinear Vibrations of Spur Gears Supported by Compliant Shafts</b> . . . . .	97
Cheng Wang, Hui Liu, Minggang Du and Changle Xiang	
<b>Analysis of Transmission Performance for Asynchronous Magnetic Coupler with Trapezoidal Halbach-Array Permanent Magnet</b> . . . . .	125
Chaojun Yang, Kang Liu, Yingzhi Wu, Weifeng Zhang, Ming Liu and Muhammad Mujtaba	

<b>The Analysis of the Flexible Load Sharing Structure of the Ring Gear in Planetary Transmission</b> . . . . .	139
Congfang Hu, Xiao Yin, Ruitao Peng, Rui Chen, Jingang Liu and Shengqiang Jiang	
<b>Review of Research on Space Curve Meshing Theory and Its Applications</b> . . . . .	151
Zhen Chen, Huafeng Ding, Bo Li, Weimin Zhang, Linbo Luo and Liang Zhang	
<b>Load Distribution Research on Flexible Bearing in Harmonic Drive</b> . . .	165
Lin Tian, Yi Jiang, Yazhen Wang, Qun Tong, Dashi Su and Li Song	
<b>Investigation of Developing Cutting Performance of Economic CNC Lathe by Shorten the Spindle Transmission Link</b> . . . . .	177
Jian Qiu, Yuhou Wu, Cong Geng and Renpeng GE	
<b>Structure Design and Analysis of Electromagnetic Induction Applicator Roll for Five-Rolls Solvent-Free Coating Machine</b> . . . . .	195
Xuejia Huang, Nengsheng Bao, Leilei Zhang and Zhipeng Lu	
<b>Nonlinear Dynamic Modeling of 3-DOF Gear System with Tooth Contact Temperature</b> . . . . .	213
Jianfei Shi, Xiangfeng Gou, Lingyun Zhu and Changjun Qi	
<b>Thermodynamic Research on Flexible Bearing in Harmonic Drive</b> . . . .	227
Bin Huang, Yazhen Wang, Kun Zhao, Dashi Su and Li Song	
<b>Influence of the Oblique Trimmed Impeller on Pressure Fluctuations in Centrifugal Pump at Low Flow Rate</b> . . . . .	239
Rui Cao, Qiaorui Si, Guochen Sheng and Gang Lin	
<b>Influence of Pressure Angle on Tooth Surface Contact Stress of the Asymmetric Gear with Double Pressure Angles Meshing Beyond the Pitch Point</b> . . . . .	253
Xiulian Li, Jiangxin Yang, Xusong Xu, Wei Liu, Xiaofang Shi and Qing He	
<b>Parametric Design and Motion Characteristics Analysis of Elliptical Gear</b> . . . . .	261
Yongping Liu, Changbin Dong, Xiumei Wang, Jianmin An and Yuxi Feng	
<b>Optimal Design of Experimental Platform for Electronic-Hydraulic Driving Vehicle Based on the Multi-factor Synthetic Evaluation Model</b> . . . . .	271
Chao Wang, Xiaohui He, Xinmin Shen, Xiaocui Yang, Lei Xu, Qiang Wang and Anxin Liu	

<b>An Approach of Knowledge Acquisition in Biologically Inspired Design</b> .....	285
Shuo Jiang, Jie Hu, Jin Ma, Jin Qi, Zhenyu Pan and Jian Shen	
<b>Research on the Design Method of Lightweight Lattice Sandwich Structure for Additive Manufacturing</b> .....	301
Fuming Zeng, Haoyu Deng, Xiaoyu Zhang and Chunjie Wang	
<b>CoModel: A Modelica-Based Collaborative Design Web Platform for CPS Products</b> .....	317
Chao Wang, Li Wan and Tifan Xiong	
<b>An Isogeometric Topology Optimization Method for Continuum Structure</b> .....	335
Shuting Wang, Manman Xu, Yingjun Wang, Zijun Wu and Lunhong Liu	
<b>Design of Position Feedback System with Data Fusion Technology for Large Hydraulic Manipulator</b> .....	349
Xichang Liang, Yi Wan, Chengrui Zhang and Yanyun Kou	
<b>Modeling the Behavior Process of Electromechanical Systems Based on Behavior Trees</b> .....	363
Peilin Yang, Chongchong Xue, Qing Liu, Yi Hou and Huanru Jia	
<b>Lightweight Design of Multistage Gear Reducer Based on Continuous Variables and Discrete Neighborhood</b> .....	379
Zhuli Liu, Zhuan You and Zhuxin Wang	
<b>Multi-objective Topology Optimization for Supporting Plate of Winch Drum Spindle</b> .....	389
Jianan Xu, Xin Gao and Dongyue Qu	
<b>Research on Key Technologies of Intelligent Finite Element Analysis Based on Knowledge Reuse</b> .....	403
Qinyi Ma, Dapeng Xie, Peng Xue, Lihua Song, Maojun Zhou and Junli Shi	
<b>Modeling Method of Resource Combination Optimization for Crowdsourcing Product Development Based on Cloud</b> .....	419
Yuming Guo and Shikun Xie	
<b>Multi-flow Problem Mining of Complex Electromechanical System Based on Flow Analysis</b> .....	433
Juan Wang, Jianhui Zhang and Rui Liang	
<b>Robust Topology Optimization with Loading Magnitude and Direction Uncertainty</b> .....	455
Xiang Peng, Jianxiang Wang, Jiquan Li, Shaofei Jiang, Wanghui Bu, Bing Yi and Sihang Zhou	

**Point Clouds Based 3D Facial Expression Generation . . . . .** 467  
Mei Xue, Shogo Tokai and Hiroyuki Hase

**The Influence of Product Style on Consumer Satisfaction: Regulation  
by Product Involvement . . . . .** 485  
Chang Ge, Lang Zhang and Chunqiang Zhang

**Design Factor Analysis Based on Fractional Factorial Experiment . . . .** 495  
Yangdong Wu

**A Novel Reliability-Based Design Optimization Method Using  
Ensemble of Metamodels . . . . .** 507  
Xiaoke Li, Zhenzhong Chen, Haobo Qiu, Chen Jiang, Yanqiu Xiao  
and Jun Ma

**A Two-level Robust Design Approach to Adaptive  
Product Platform . . . . .** 523  
Xianfu Cheng and Renbin Xiao

**Cloud Service-Based Collaborative Design Resource Management. . . .** 539  
Risheng Yang, Bin He, Yicheng Hua, Fangfang Li, Lixin Lu, Shuxun Li  
and Limin Li

**Layout Knowledge Multi Granularity Reconstruction Method for  
Complex Product . . . . .** 553  
Sarina, Pengwen Sun and Zhiguo Li

**Product Disassembly Sequence Planning Based on Combining and  
Pruning Algorithm . . . . .** 567  
Yang Wang, Ruisen Li and Guodong Yi

**Design and Analysis of the Steering and Braking Integrated Control  
Network for Commercial Vehicle . . . . .** 579  
Jian Hu, Peng Liu, Jun Xu and Gangyan Li

**Design and Optimization of the Faucet Flow Channel Structure . . . . .** 595  
Yongcheng Xu, Fan Jiang, Jiangdong Chen and Sijie Li

**A Process Monitoring Method Based on Dual-Parameter  
Optimization. . . . .** 615  
Yasenjiang Jiarula, Wenlei Sun, Jun Fan, Qing Tao  
and Reyihan’guli Musha

**Optimal Design of Gantry Machining Center Welding Crossbeam  
Structure Based on the ICM . . . . .** 631  
Dehong Zhao, Xiaojun Ji, Feng Lu, Wei Wu and Guangyu Yan

**Design and Optimization on Annular-Flow Nozzle of the Oil-Water  
Pump . . . . .** 645  
Sijie Li, Fan Jiang, Yongcheng Xu and Jiangdong Chen

**A Novel Auto Design Method of Acoustic Filter Based on Genetic Programming** . . . . . 661  
Qi Zhou, Chaoqun Wu, Weijing Zhao, Weijie Hua and Linghao Liu

**A CAD Model Retrieval System Based on Design Intent** . . . . . 691  
Qinyi Ma, Lihua Song, Peng Xue, Dapeng Xie, Maojun Zhou and Junli Shi

**Improving Design Method of Loader Cockpit Through Ergonomics Simulation and Analysis** . . . . . 707  
Hang Yin, Gang Liu and Yang Yan

**A Rapid Design Method of Anti-deformation Fixture Layout for Thin-Walled Structures** . . . . . 721  
Shien Zhou, Chan Qiu, Zhenyu Liu and Jianrong Tan

**Study on Oil Pressure Characteristics and Trajectory Tracking Control in the Electro-hydraulic Servo System of a Torsional Isolator with Negative Stiffness Structures** . . . . . 735  
Wenping Li, Hui Liu, Xiaojie Wang and Tiantian Gao

**Study on Dynamic Stability of a Torsional Isolator with Negative Stiffness Structures** . . . . . 749  
Tiantian Gao, Hui Liu, Xiaojie Wang and Wenping Li

**Design and Research of a Late-Model Intelligent Speed Limit System** . . . . . 765  
Jiawen He, Yang Wang and Zhonghao Han

**Shaft Torque Compensation for Electric Vehicle Driveline Oscillation Active Damping with Feedforward and PID Feedback Controller** . . . . . 777  
Hui Liu, Yinqi Chen, Xun Zhang and Wenping Li

**Functional Analysis Method for Dynamic Speed Ratio Control of CVT-Based Vehicles** . . . . . 791  
Bo Li, Wei Wu, Xueyuan Li and Shihua Yuan

**Vibration Characteristics of Truss Core Panels Based on Laser Additive Manufacturing** . . . . . 805  
Guoli Wang, Yidong Luan, Wei Yang and Jian Wang

**Comparative Study on Parameter Estimation Methods for Multi-fidelity Co-kriging Modeling** . . . . . 815  
Yixin Liu, Shishi Chen and Fenfen Xiong

**The Design and Research of the Pole Damage Prevention Device of Distribution Lines in Meteorological Disasters** . . . . . 837  
Jiaqi Wen, Qingchun Hu, Zhisheng Lin and Kai Xiao

**Volume 2**

**Research on Structure Optimization of Longitudinal Feed System Design of CNC Spinning Machine** . . . . . 853  
Wei Luo, Zhaojun Yang, Fei Chen, Liping Wang, Bo Lu, Yaming Guo and Hongwei Zheng

**Modeling and Simulation of Hoist Rope for Excavator Based on Virtual Prototype** . . . . . 873  
Yongliang Yuan, Li Du, Wei Sun, Xueguan Song and Junzhou Huo

**Experimental Research on Particle Damper with Viscoelastic Coating** . . . . . 889  
Xiangzhi Meng, Zhijie Wang and Xianbin Yan

**Dynamics Simulation of Hydraulic Excavator Working Device Based on ADAMS** . . . . . 899  
Leilei Cao, Qijun Wang, Lulu Cao and Yufeng Gu

**Numerical Simulation and Wind Tunnel Test Validation of the Aerodynamic Brake Panel** . . . . . 911  
Liqiang Gao, Xiong Hu, Dejian Sun, Ying Xi and Guohua Wang

**Investigation on the Optimal Energy Recovery System for the Military Hybrid Vehicle Based upon the Comprehensive Evaluation Method** . . . . . 923  
Lei Xu, Xiaohui He, Xinmin Shen, Xiaocui Yang, Chao Wang, Qiang Wang and Anxin Liu

**Formation Mechanism of Micro-vibration in Aerostatic Bearing Used in Miniature Aircraft Engine** . . . . . 937  
Wei Long, Shao-hua Yang and Ling Gong

**Static and Dynamic Deformation Analysis and Optimization of a Fine Blanking Press Frame** . . . . . 953  
Guodong Yi, Jundi Wu and Ruisen Li

**Research Status and Development Trend of the Contact Vibration Small Berry Harvester** . . . . . 969  
Yanling Zhao, Chuang Yang, Yudong Bao, Xianli Liu and Yanling Guo

**Research on the Impact Characteristics of Cylinder Based on Integrated Analysis Methods** . . . . . 985  
Jian Hu, Yang Zhang, Fei Li and Gangyan Li

**Co-simulation and Analysis of Radar Skeleton Based on ANSYS and ADAMS** . . . . . 1013  
Jian Hu, Linwei Li, Panpan Zhou, Gangyan Li and Qipeng Sun

<b>Simulation Research on Tool Temperature Field in High Speed Inner Cooling Milling</b> . . . . .	1025
Lihong Wen, Guanghui Li, Ningxia Yin and Guangyu Tan	
<b>Effects of the Novel Flow Field Design on the DMFC Performance</b> . . . .	1037
Qinwen Yang, Ying Zhu, Gang Xiao and Xuqu Hu	
<b>Research on Simple Calibration and Compensation of a Robot System Used in Machining</b> . . . . .	1045
Tie Zhang, Qiufen Li and Yanbiao Zou	
<b>Kinematics and Dynamics of Excavator Based on Screw Theory</b> . . . . .	1063
Guosheng Xu and Guangming Lv	
<b>Development of an In-Pipe Robot with a Novel Differential Mechanism</b> . . . . .	1079
Qing Li, Yiang Sun, Haitao Liu, Meng Zhang and Xiaowei Meng	
<b>Design of a 5R Mechanism in Confined Space Based on Reducing the Dimension of the Configuration Manifold</b> . . . . .	1099
Bu Wanghui, Hou Kun, Yan Shuang, Peng Xiang and Yi Bing	
<b>On the Design and Experiments of Rotation-Traction Manipulation Training Robot</b> . . . . .	1111
Qingdong Zhang, Tie Fu, Liwei Shao, Hongsheng Ding, Minshan Feng and Liguozhu	
<b>Design and Impedance Control of the Integrated Rotary Compliant Joint</b> . . . . .	1125
Leping Chen, Hongsheng Ding, Tie Fu, Jian Li and Liwei Shao	
<b>An Extended Application of NURBS for Robot Motion Planning</b> . . . . .	1141
Xu Wang and Weizhong Guo	
<b>An Efficient Approach for Collision-Free Trajectory Planning Using Adaptive Velocity Vector Field Algorithm</b> . . . . .	1169
Jingmei Zhai, Kun Liu, Haiyang He and Fan Ouyang	
<b>A Novel Robot Trajectory Planning Algorithm Based on NURBS Velocity Adaptive Interpolation</b> . . . . .	1191
Qingxiao Zou, Weidong Guo and Fouaz Younès Hamimid	
<b>Tensor Method for Mechanism Motion Analysis</b> . . . . .	1209
Jianshe Gao, Baotang Wang, Weilong Zuo and Qianyu Yu	
<b>Study on Gait Planning and Simulation of a Novel Hybrid Quadruped Robot</b> . . . . .	1225
Jianshe Gao, Yuchuang Wang, Qianyu Yu and Weilong Zuo	

**Closed-Loop Inverse Kinematic Analysis of Redundant Manipulators with Joint Limits** . . . . . 1241  
Yi Wan, Yanyun Kou and Xichang Liang

**Structure Design and Positive Kinematics Analysis of Medical Pneumatic Soft Robot.** . . . . . 1257  
Duanling Li, Ying Guo and Fei Gao

**Super Harmonic Resonance Analysis of a Novel Controllable Metamorphic Palletizing Robot Mechanism with Impact as Its Configuration Change** . . . . . 1273  
Rugui Wang, Huiqing Chen, Yexun Li, Jiaying Sun, Jiwei Yuan and Ganwei Cai

**Design and Analysis of a Compliant Parallel Polishing Toolhead** . . . . . 1291  
Jiangdong Chen, Fan Jiang, Yongcheng Xu and Sijie Li

**Kinematics and Performance Analysis of Two Types of 3-RPS Parallel Mechanisms** . . . . . 1309  
Yongfeng Wang, Shuncheng Fan, Xiaojun Zhang, Guangda Lu and Jing Yang

**An Alternative Inverse Kinematics Position Analysis for the Control of Welding Robot** . . . . . 1323  
Wenjuan Li, Yuefeng Du, Zhenghe Song, Xueyan Zhao and Enrong Mao

**A Hybrid Optimization Method of Dimensions for the Tricept Parallel Robot** . . . . . 1343  
Shuai Fan, Shouwen Fan and Xin Zhang

**Design and Simulation Analysis of Cam-Type Parallel Manipulator** . . . . . 1365  
Zhenghao Ge, Jiaojuan Shen, Zhilong Wang and Xiaoyu Han

**Position and Workspace Analysis of a Novel 4-DOF Parallel Mechanism Using a Computer Aided Geometry Approach** . . . . . 1377  
Yanhua Zhang, Xiuju Du and Baiyong Zhang

**Modal Optimization Analysis of Large-Scale Modular Deployable Structure for SAR** . . . . . 1389  
Xingze Wang, Biao Li, Lin Li, Xiao Li, Duanling Li and Kaijie Dong

**Forward Kinematics Analysis of the Gough-Stewart Platform Using Orthogonal Complement Method** . . . . . 1401  
Shili Cheng and Hongtao Wu

**Energy Dissipation Analysis of Two Particles with Different Volume Under Fixed Mass** . . . . . 1417  
Xiangzhi Meng, Zhijie Wang, Xianbin Yan and Lixin Fu



<b>Identification of States and Their Sequences in the Function Execution Process of Electromechanical Systems</b> . . . . .	1431
Peilin Yang, Kai Xu, Yi Hou, Qing Liu and Huanru Jia	
<b>A Classification Method for Abnormal Patterns of Complex Electromechanical System for Discriminant Analysis</b> . . . . .	1441
Nuclear Entropy . . . . .	
Jiarula Ya Sen Jiang, Jianmin Gao, Zhiyong Gao and Hongquan Jiang	
<b>Heat Transfer and Leakage Analysis for R410A Refrigeration Scroll Compressor</b> . . . . .	1453
Bin Peng, Lemort Vincent and Wuyin Jin	
<b>The Performance Analysis of Anti-rolling Torsion Bar of High-Speed Train</b> . . . . .	1471
Haiyan Zhu, Yi Zhang, Pingbo Wu and Jing Zeng	
<b>Strength Analysis of EMU Wheels</b> . . . . .	1483
Jiyong Huang and Haiyan Zhu	
<b>Fatigue Performance Analysis of Titanium Alloy Welded Joints Based on Rough Set</b> . . . . .	1495
Li Zou, Xinhua Yang, Xiaozhen Mi and Yibo Sun	
<b>Effects of Bolt Misalignment on Stress Around Plate Hole</b> . . . . .	1511
Wenguang Liu and Weiyan Lin	
<b>Reliability Analysis of Multi-rotor UAV Based on Fault Tree and Monte Carlo Simulation</b> . . . . .	1525
Qiang Wang, Jian Mao and Hong-yuan Wei	
<b>Study on High Temperature Friction and Wear Characteristics of 4Cr9Si2 Valve Steel</b> . . . . .	1535
Shengguan Qu, Lianmin Yin, Fuqiang Lai, Chuanwei Xiao and Xiaoqiang Li	
<b>Study on Multi Wire Grinding of Super-Hard Materials</b> . . . . .	1547
Lujiang Li and Zhe Wang	
<b>An Ultra-Fast and Large-Scale Fabrication Method for Paper-Based Microfluidic Chips</b> . . . . .	1561
Hao Sun, Hui Dong and Jianping Zheng	
<b>The Research on Magnetic Fluid Shaft Sealing for Chemical Reactor</b> . . . . .	1573
Zhili Zhang, Nannan Di, Hanghang Cheng and Decai Li	
<b>Impact Evaluation Approach of a Texture Cross Section Shape on Hydrodynamic Lubrication Performance</b> . . . . .	1593
Xia He, Wenling Liao, Guorong Wang and Mengyuan Li	

<b>Parametric Analysis Method for Acoustic Emission Test of High Pressure Gas Cylinder Materials . . . . .</b>	<b>1613</b>
Qiujuan Lv, Chengzhan Ying, Xinfeng Wang and Min Chen	
<b>Simulation Analysis of Influences of Protrusion in Precision Machined Texture on Hydrodynamic Lubrication Performance . . . . .</b>	<b>1621</b>
Xia He, Wenling Liao, Guorong Wang, Mengyuan Li and Jiang Shikai	
<b>Analysis and Testing on Material Removal Mechanism on Ultrasonic Composite Electrochemical Machining . . . . .</b>	<b>1635</b>
Linlin Li and Yongwei Zhu	
<b>Property Analysis and Manufacturing Technology Study About the Micro-structures Stored Oil on Friction Units' Surface . . . . .</b>	<b>1647</b>
Qingqing Zhao, Zhengquan Deng, Dashi Yang, Xiang Gu and Yongwei Zhu	
<b>Friction and Wear Properties of <math>\text{Al}_2\text{O}_3/\text{TiC}/\text{CaF}_2@ \text{Al}_2\text{O}_3</math> Self-lubrication Ceramic Cutting Tool Materials. . . . .</b>	<b>1659</b>
Zhaoqiang Chen, Runxin Guo, Chonghai Xu and Hui Chen	
<b>Reliability-Based Robust Optimal Design of Structures with Variable Cross-Section . . . . .</b>	<b>1671</b>
Tianxiao Zhang	
<b>Supervised Bayesian Tensor Factorization for Multi-relational Data in Product Design . . . . .</b>	<b>1687</b>
Xu Tan, Zhenyu Liu and Guifang Duan	
<b>Gear-Shifting Control Strategy for Parallel Hybrid Electric Truck in Starting Process . . . . .</b>	<b>1699</b>
Jun Xu, Yuxiang Li, Zhiqiang Gu, Gangyan Li and Jian Hu	

Advances in Mechanical Design

Proceedings of the 2017 International Conference on  
Mechanical Design (ICMD2017)

Tan, J.; Gao, F.; Xiang, C. (Eds.)

2018, XVIII, 1707 p. 1077 illus. In 2 volumes, not  
available separately., Hardcover

ISBN: 978-981-10-6552-1