

Table of Contents

Preface and Organizing Committee

Chapter 1: Applied Mechanics

Model Construction and Experiment Study of the Fuel Nucleus Boiling Process on Hot Surface B.Y. Liu, H.J. Qiu, J.S. Qiu, X.L. Yi and K.B. Wang	3
Simulation of Stress Changes of Shale Reservoirs during Hydraulic Fracturing to Create Fracture Networks G.M. Zhang, J.D. Liu, C.M. Xiong, H. Liu and J. Jin	10
Research on the Wing Kinematics and Bionic Model of Cicada X.J. Zhang, Q.Q. Huang, X. Luo, Y. Zhao, Z.J. Cheng and Y. Wang	17
Normal Force Computation for Axisymmetric Multistage Launch Vehicle L.K. Abbas, D.Y. Chen and X.T. Rui	23
Effect of Surface Conservation Law on Large Eddy Simulation Based on Seventh-Order Dissipative Compact Scheme Y. Jiang, M.L. Mao, X.G. Deng and H.Y. Liu	30
The Dynamic Analysis of the Twin-Lift Lattice Crane Truss L.L. Lu, Y.J. Chiu, C.H. Yang and L.M. Chang	38
Similar Constructing Method for Solving the Model of the Plane Radial Flow of Dual Permeability Reservoir C.Y. Fan, S.C. Li, D.D. Gui, M. Hu and H.C. Li	43
Improvement of Large Size Smoke Duct Installation Plan T. Cheng, C.G. Wei and Y.Q. Li	51
Investigation of Computational Non-Linear Aeroelastic Response of High Aspect Ratio Wing H. Rahman and M. Li	55
Thick Crescent Iced Sub-Conductors Spacing Influence on the Aerodynamic Properties L.J. Ma, S.Y. Hao and Q.C. Zhang	62
Roads Leading to Chaos and Chaotic Border Control of Aircraft Vertical Maneuvering at High Angles of Attack Z.H. Zhang, H. Yao, X.Z. Peng and L. Su	67
Mechanical Analysis of Scissor Transmission Mechanism Considering Friction F. Zhang, X. Yuan and J. Chen	74
The Aero-Thermodynamic Effect Simulation Study of Solid Motor Grain W.G. Pan, T. Li, G.R. Bian and J.R. Cao	81
Improvement of Performance on Flow-Cutoff of Flap Valves Set in the Pressurized Tank of Pumping Station Based on Numerical Simulation Y.H. Yu and B. Cheng	86
Calculation and Analysis on Thermodynamics Calculation of Nature-Gas Pipelines with Electric Heat Tracing S.R. Yang, D. Xu, C. Duan, Y.Y. Ge and M.R. Zhang	91
Simulation on the Process of Cavity Wall Expansion of Cone at Constant Speed Water-Entry W. Cao, C.T. He and C. Wang	97
The Higher Order Axis-Directional Crack-Tip Field for Power FGMs Cylindrical Shell with Reissner's Effect Y. Dai, L. Zhang and X. Chong	103
The Higher Order Circumferential Crack-Tip Field for Power FGMs Cylindrical Shell with Reissner's Effect Y. Dai, L. Zhang and X. Chong	107
Analysis of Pressure Distribution on Head Disk Air Bearing Slider Involved Van der Waals Force H.R. Ao, M. Dong, X.C. Wang and H.Y. Jiang	111

Dynamic Analysis of Active Mass Damper F.G.O. Gutiérrez, H.G. Acuña and O. Lengerke	117
Dynamics Analysis of Industrial Sewing Machine Frame Based on FEA and Modal Experiment L. Zhang, C. Kai and X.J. Wang	122
Simulation of Viscous Flow around Surface Ship Using ANSYS-Fluent CFD Code S.L. Chen and S.L. Yang	127
On the Collapse of Offshore Pipelines under External Pressure and Axial Force N. Gan and J.H. Xue	134
Application of a Discrete Transfer Matrix Method in Analysis of Acoustic Attenuation Performance of Complex Perforated Pipe Mufflers H. Rui, M. Bei and Z. Lei	140
Maneuvering Target Tracking Algorithm Based on IMMCKF J.W. Hu, P. Zhou, H. Xie, L. Luo and H.B. He	145
Analysis and Calculation of Concentric Coil Area L. Du, G.C. Shi and J.J. Zhao	151
Locating Error Analysis for Cartesian Positioner Y.C. Gai, W.D. Zhu, Y.L. Ke, X.H. Yin, J.H. Wu and W. Wang	157

Chapter 2: Mechanical Engineering and Manufacturing Technology

Flow Field Research on an M-Beam Separator Y.G. Luan, N. Liu, Z.W. Ma, Z.H. Zhao and X.M. Pei	165
Accuracy Reliability Sensitivity Analysis of Power Servo Tool Holder C.Y. Li, X.C. Kang, N. Wu and W.Y. Dai	171
Experimental Study Based on the Widening Melting Roads Cladding Forming of the Hollow Laser L.L. Yu, S.H. Shi, G.Y. Fu and M.L. Tian	180
The Simulation of the Launching Process on Concentration Water Injection Launcher X.F. Zhou, Y. Jiang, Y.S. Niu and S.Z. Yu	186
Development and Application of Optimal Software on Distributing Flow in Pumping Station H.T. Zeng, L.L. Lin, Z.X. Wang and W.G. Tian	192
The Analysis of Stiffness and Stability of Luffing Jib Cranes Based on Theory of Second Order Y. Xue, J. Li, N.L. Lu and D.Q. Wu	197
Finite Element Analysis for Wave Spring of Multi-Disc Wet Clutch Based on ANSYS Y. Yu, Y.R. Peng, S.X. Lan and P. Zhou	203
The Structure Design and Exhaust Mechanism on Hybrid Supercharger H.P. Xiao, Z.F. Fang, J. Fang, H. Li, K.D. He and W.H. Yang	209
Research of Mechanism and Experiment of 4LZ-3.0 Self-Propelled Pepper Harvester Y.C. Chen, L.J. Kong, H.X. Wang, J.J. Li and R.M. Li	217
Dynamic Analysis of Multi-Supported Nonlinear Vibration Isolation System Mounted on Flexible Foundation R. Huo, H. Yu and Y.F. Guan	223
Study on Threat Assessment Based on Rough Set and Support Vector Machines for Regression in BVR Air Combat L.Y. Wu, Y.Q. Sun and J.Y. Ji	228
The Study on Five Order Hypernormal Form of Icing Suspension Cable Model C. Hao, B. He and J. Li	235
Equal Strength Continuous Sucker Rod's Optimization Design J.D. Ma, Y.X. Li and S.Z. Lin	240
Dynamical Behaviors of a Four-Wheel-Steering System under the Sense of Mean Value D.W. Huang, H.L. Wang and Y.F. Guo	244
Kinematics Analysis of Multi-Functional 4-DOF Mechanical Arm Q. Yu and X.R. Liu	250
Simulation Research on a Subsonic Flow around Plane Cascade L. Cao, Z.H. Zhao and S.Y. Li	258

Designing and Realization of Differential Pressure Densimeter for Heavy Medium Coal Preparation Based on MCU	
Y. Cao, L. Zhang, Y.W. Liu and W. Zhang	264
The Honing Process for Precision Holes	
Z. Zhang, P.M. Dong and Z. Dong	269
Axial Vibration Analysis of Stepped Bar by Differential Transformation Method	
Z.G. Wang	273
Analyzing the Contacting Stresses of Ball in Servo Disc Brake	
J.Y. Tian, Z.N. Ren, J.W. Wang, J.Y. Yao, S.X. Lan and P. Zhou	280
Application of Periodic Boundary Conditions in Studying Stent Expansion	
G.Y. Jiao, P.P. Li and R.J. Zhang	286
Effect of Surface Topography on Contact Property of the End Face for Mechanical Seal	
G.F. Fang, P.G. Zhang and L. Wei	292
Development of New Type of Visualizer for Point Contact and its Flow Field Analysis	
B.Y. Song, T.Y. Sui and F. Zhang	299

Chapter 3: Applied Materials Engineering and Materials Processing Technology

Process Parameters Control of Deposition of Hollow Cylindrical Part with Internal Wire Feeding through a Hollow Laser Beam	
M.J. Wu, S.H. Shi, G.Y. Fu and Y. Liu	305
Study on Laser Rapid Prototyping of High Thin-Walled Revolved Parts with Variable Diameters Based on Inside-Laser Coaxial Powder Feeding	
M.L. Tian, S.H. Shi, G.Y. Fu and L.L. Yu	310
The Plastic Deformation and Enhancement of 304Stainless Steel under Low Stress Repeat Impact	
Z.D. He, J. Shi and G.Y. Fu	316
Detection and Identification of Different Metal Materials with Same Damage of Stretching Based on Acoustic Emission in Audible Domain	
Y.T. Lu, Z.B. Deng, Y. Yuan, Q. Xu and C. Zhang	321
Optimization of Medium Components for β-Glucosidase Production from Aspergillus Niger by Response Surface Methodology	
C. Zhang, R. Huang, H. Tian, R.M. Zhao, F.S. Yu, J. Yao and D.C. Gong	328
Tribological Behavior of Ion Implanted AISI 440C Stainless Steel under Oil Lubricated Condition	
F.B. Liu, H.P. Li, Y. Cui, J.J. Di, M. Qu and Q.G. Sun	334
The Study on Infrared Stealthy of Variable Emissivity Materials Based on the Radiation Contrast	
G. Xia and L. Yang	341
The Surface Quality Experimental Analysis of Rotary Ultrasonic Machining	
C.L. Xu, X.H. Tang and T.Y. Xia	348
Numerical Analysis on the Electrical Performance of Microstructured Environmentally-Friendly Electrical Contact Material Ag/SnO₂	
L. Wang, W.L. Liu and L.S. Chen	355
Effect of Ultrasonic Wave on Latex Production and Quality of Rubber Tree	
D.M. Zhu, W.F. Lin, L.X. Kong, M. Chen, W. Jing, J.Y. Qian, Y.J. Deng, Z. Li and L.J. Lin	360
The Phase Transformations during Fluidized-Bed Combustion of Biomass	
H.P. Teng, B. Yang and B. Liang	366
Development of Cast Steel for Brake Disc of High-Speed Train	
J.S. Li, H.P. Li, B.Q. Jiao, B.J. Lv, D.F. Chen and L.L. Gu	370
Mesh Creation Using Hypermesh for Casting Simulation	
A. Moissiadis and D. Paschaloudis	376
Wear and Corrosion Resistances of Inconel718, HVOF Coating of WC-Metal Powder and Laser Heat-Treated Coating	
H.G. Chun, Y.K. Joo, J.H. Yoon, T.Y. Cho, W. Fang and S.H. Zhang	381

Synthetic Topographical Characterization Analysis of Oxygen Free Copper Surface Prepared by UVG on the Basis of Wavelet S.L. Wu, J. Zhao and S.C. Li	388
Preform and Die Designs for Hot Forging Process of Linear Slide Block C.H. Yu and J.J. Sheu	395
Research Progress of the Preparation and Application of Low Dielectric Materials P. Wang, L.H. Cheng, C.L. Liang, J.Q. Zhao and Z.J. Jiang	401
The Preparation and Characteristic of PNIPAAm/ Hydrogel Nanocompounds by Radiation Techniquis for Bone Filling Materials and its Cytotoxicity T.H. Wu, H.R. Lin and L.H. Shen	407
Fractal Study for Surface Cracks of Rubber Concrete Beam on Concentrated Load H.Q. Sun and W.H. Zhou	412
Study of Low Stress Repeated Impact Deformation of Gradient Coating J.W. Ruan, G.Y. Fu, S.H. Shi and C. Ding	418
Dynamic Model of Elastically Mounted Machinery with Cylindrical Shell W. Xu, C.G. Shuai and Z.Q. Lv	423
Visualization of Mach 3.0/3.8 Flow around Blunt Cone with Supersonic Film Cooling Y.Z. Zhu, S.H. Yi, L.F. Tian, L. He and Z. Chen	432
Design and Simulate of Golf Wood Club Z.M. Feng, Y.J. Chiu and H.H. Chen	438

Chapter 4: Technology and Method for Measurement, Test, Detection and Monitoring

Subway Platform RF Electromagnetic Field Strength Test L.W. Song	445
Design and Development of Integrated Tester for the Hydraulic System on a Certain Type of Equipment H.P. Guo, N. Li, C. Tian and S.L. Zhao	451
Fisher Discriminant Analysis Predicted Model of Criticality of Karst Water Disasters from Coal Seam Floor and its Application W. Qiao	457
Validating the New Equivalent Static Design Method of Spacecraft Structures in Random Vibration by Test Y.M. Zhang, Z.Y. Han, S.D. Shi and L.M. Tan	464
Typical Errors Analysis in Frequency Response Function Measurement J.W. Zhou, L. He and R.W. Xu	470
Design and Experiment of Underwater Monitoring System for Fish Domestication Equipment L. Zhang, Q.S. Hu, S.L. Zhang, S.Y. Zhang and C.X. Bai	477
Optimal Design of Grinding Temperature Measurement Platform Based on Improved Thermocouple in Production R.B. Li and C. Cui	483
An Analysis of Dimension Roundness of Machine Elements Survey G. Mi	489
Confirmation of Anisotropic Strains for FCC Poly Crystals and an Analysis of the Mechanism D.Q. Pang, Y.C. Sun and H. Hutchinson	494
Prediction and Governance of Mine Gas Emission Y.W. Liu, Y. Cao, L. Zhang and M.C. Meng	500
Initialization Time Test and Analysis about the Control Unit of Fuel Cell Vehicle C. Wu, W.M. Liang, X.N. Lai and F. Liu	505
Torsional Vibration Analysis of E-Type Membrane for Six-Axis Force Sensor L.F. Xie and D.Z. Xu	511
The Noise Analysis of Fluid Systemsin Solid-State Nanopore Sensors S. Ying, L. Wang and W.Y. Zhao	517
Design of Monitoring System with Advanced Applications for Wind Farms R. Chen, X.W. Zhang, H.C. Yao, T.F. Qiu and S. Liang	521

Design of Digital Receiver Based on FPGA L. Zhang, Y.W. Liu and Y. Cao	528
Design and Experimental Study of a 6-DOF Material Testing Machine D. Wang, R. Fan, J.Z. Guo, W.Y. Chen and Y.S. Sun	533
Research on Image Acquisition and Data Transmission System of Burden Surface in Blast Furnace L.Q. Wang and L. Zhou	543
Model of Martian Crustal Magnetic Field Based on Equivalent Currents D.S. Tong	550
Wireless Remote Data Acquisition and Network Transmission for Micro-Seismic Signals H.H. Bian, Y.D. Wang, Y.A. Cao and W. Hao	555
Pseudo Static Test Research for Seismic Shear Keys of Bridge W.S. Zheng and G.W. Tang	563
Dynamics Analysis of Debris in the Thin Cavity Z.Y. Lu, C.W. Liu and S.S. Fu	570
Experimental Study of the Shear Strength of Cobalt-Rich Crusts H.Y. Wu and Z. Chen	576
Research and Implementation of the Retrieval System Based on Texture and Shape Z.W. Tu, K.M. Wang, Y. Dong and Y. Zhao	581
Validity Range of Micropipette Radius in Using Hemispherical Cap Model G.Y. Jiao, M. Dao, C.H. Sow and C.T. Lim	587
Finite Element Modeling of Sound Transmission Based on Micro-Computer Tomography for Human Ear J.B. Tian, N. Ta, Z.S. Rao, L.F. Xu and X.S. Huang	593
Dual-Channel Measurement System for Real-Time Ethernet D. Jin, C.R. Zhang, T.L. Hu and M.J. Hou	602

Chapter 5: Control and Automation Technologies

Some Notes on the Grassmann Manifolds and Nonlinear System C.N. Zeng and P. Tao	611
Boiling Pattern and Thermal Ignition Experiment Study of the Aviation Fuel on Hot Surface H.J. Qiu, J.S. Qiu, B.Y. Liu, X.L. Yi and K.B. Wang	616
Research on the Low Velocity Accuracy Control of the Direct Drive Volume Control Electro-Hydraulic Servo System J.F. Wang, L.H. Liang and L.Y. Wang	623
Hierarchical Intelligent Alignment Control of Air Spring Vibration Isolation System of Ship Propulsion Plant W.J. Bu, Y.L. Zhao and L. Shi	630
Attitude Control of Air Spring Isolation System L. Shi, Y.L. Zhao and W.J. Bo	636
A Model-Based Control Design for a Planar Loading Simulator R. Fan, H.R. Guo and D. Wang	642
Gantry Crane Dynamic Modeling and Motion Control W.Z. Du, Z. Xie, F. Lu and Y. Cao	649
Research on the ECAS System Model and Control Strategy X.J. Zhang, H.Y. Li, Z.D. Fang, M.T. Wang, J.W. Pan and C. Li	654
The Electronic Part of the Metal Tube Rotameter B. Mo, F.Y. Jiang and H.X. Zhang	661
The Study of Wireless Network Communication in the Monitoring System of Stage Hydraulic System X. Gao, Z.W. Tu, Y. Dong and K.M. Wang	667
Attitude Active Disturbance Rejection Control of Agile Satellite X.X. Cai, J.J. Wu and K. Liu	673
Research and Design of Distributed Controllers for Mechanical Arms of Humanoid Robot Based on FCS C.R. Jiang, L. Li, J.Q. Bai and Y.Z. Huo	682

Application of Smart Tool Cabinet in the Temporary Grounding Wire Management C. Huang, T. Chen, S.Y. Xia, P. Zhou and Z.L. Zhang	688
The Design of Hopping Angle Control by Using PID and LQR Techniques S. Samo, S.Y. Ma and B. Sameh	693
Temperature Rise Model of Drum Brake Y.S. Guo and C. Wang	701
Adaptive Fuzzy PID Controller of a Master-Slave Robotic Catheter System in Minimally Invasive Surgery X.M. Zhao, M.M. Jiang, H.Y. Li and H. Liu	706
Zero Phase Robust Control of XY Table Linear Servo System X.M. Zhao, M.M. Jiang, H.Y. Li and H. Liu	713
Trajectory Tracking Control of a Quad-Rotor UAV D.X. Xu, Y.H. Wei and K.P. He	718
Research on Control System of Pitching Pose Error Elimination for Boom-Type Roadheader Y.B. Du, X.G. Liu, M.R. Hao, Z.M. Liu and M. Wu	725
The Synchronous Control of Automated Manual Transmission in Three-Gear Electric Bus Z.S. Zhang, H.J. Xiao, C.F. Yang, L. Ling and B.H. Wu	731
Structural Design and System Integration of 3D Camera Pan-and-Tilt N.H. Bao, L. Xu, Y. Dong, Y. Pan, Q. Yang, C.Z. Wang, Y. Zhao and F.W. Cai	735
Control Module of 3D Camera Pan Tilt Zoom N.H. Bao, Y. Liu, Y. Dong, Y. Pan, H.Y. Xiao, C.Z. Wang, Y. Zhao, X.X. Zhang and L. Xu	740
Coal Transport Tape Control System Based on Machine Vision J. Yuan, Y.X. Liu and S.H. Shao	745
Analysis of SKF Linear Actuator Application W.T. Zuo, G.Y. Liang and H. Li	751
Development of Portable Microclimate Water-Cooled Thermoregulation Systems for Active Stakeholder Protective Garments H.C. Yu, B.Y. Li, S.J. Li, C.T. Yang and W. Chen	756
Improvement of Dynamic Models of Photovoltaic Arrays J.N. Quan, G.Y. Zhou and C.Y. Chen	761
Formation of Multiple-Robots Using Vision Based Approach B. Baasandorj, A. Reyaz, B. Battulga, D.J. Lee and K.T. Chong	768
Welding Robot Welding Process Research and Development of Intelligent Technology J.M. Yi and M. Han	774
Design of Cooling System for Infrared CCD Camera Used to Monitor Burden Surface of Blast Furnace Based on Thermoelectric Coolers L.Q. Wang, L. Zhou and H.T. Fan	778
The Research on Check Calculation of Pipe Supports in Nuclear Power Plant H.L. Liu and Y.P. Wang	784
Decision Analysis of Lane Change Based on Fuzzy Logic W. Shi and Y.P. Zhang	790
Study on Interactional Characteristics of WT Wheelchair Robot with Stairs during Stair-Climbing Process J. Wang, T. Wang, C. Yao, X.F. Li and C.D. Wu	795
VA One Applied in the Noise Control Numerical Simulation of an Indoor Substation R. Xu, Z.M. Mei, T.L. Mei, T.F. Yu, J.P. Wu and H. Fan	801
Research of Poison Gas Diffusion and Emergent Ventilation in Large Space Buildings with Obstacles X.Y. Peng, X. Zhang, X.S. Chai, S. Huang and L.X. Guo	808
Embedding Global Optimization and Kernelization into Fuzzy C-Means Clustering for Consonant/Vowel Segmentation X. Zang and K.T. Chong	814
Research of Equipment Maintenance Support Analysis Based on the Expanded ESD J.X. Huang, Y.Q. Bian and S.B. Li	820
EHA System Integration Design Analysis and Position Tracking Performance by PID Controller S.I. Jawaid and L. Wang	826

Chapter 6: Civil, Environmental Engineering and Information Technology

Effects of Freezing-Thawing Cycle of Compressibility of Cement Soil S.L. Chen, J.J. Shi, T. Yu, J. Huang and K.H. Dong	837
Simulation of Pollutant Transportation in Yinluan Open Channel under the Effects of Wind C.X. Zhang, W. Liu, L.L. Wang, C. Wang, S.Y. Yang and X.Y. You	842
Risk Grading of Water Pollution Event with Applying Pollutant Transportation Simulation C.X. Zhang, L.L. Wang, C. Wang, S.Y. Yang and X.Y. You	848
Study on the Compressibility of the Silt in Hangzhou, China Z.Y. Zhang, D.Z. Wu and C. Wang	853
Research on Water Ecological Protection and Restoration for Dangyang District of Juzhang River Area in Yichang City Y.W. Huang, A. Chen, L.J. Wang, R. Huang and D.C. Gong	858
Application of Wavelet Transform in Image Matching Technology Y.P. Zhang and W. Shi	866
Study on Boundary Conditions of the Natural Vibrations for Self-Anchored Cable-Stayed Suspension Bridges H.X. Huang, Y. Zhang, S.S. Cheng and Y.H. Qie	872
Regional Vulnerability Analysis of Grid Structure X.C. Huang, H. Qi, X.P. Zhang, L.F. Lu and Y.Y. Hu	877
Mechanism of Debris Flows in Mountain Streams C.H. Kou, S.W. Ma and M.W. Lai	883
Finite Element Analysis of Hybrid Fiber Reinforced HPC Deep Beams under Shear Load S.B. Liu and L.H. Xu	889
Thermal Analysis of Expressway Considering Wind Effect X. Cao, H. Miyashita, T. Kako, Z. Zhang and B. Song	895
Analysis of the Positive, Negative Press' Ventilating System in Offshore Platform Room T. Cheng, C.G. Wei, Y.Q. Li, Y. Wei and Q.J. Ma	905
Experimental Study on Fire Area Resistance during Mine Fire Period W.C. Wang, Y.H. Jiang, Y. Lu, B. Zhang and W.G. Gong	910
Cascading Failures in Two-Layered Interdependent Scale-Free Networks X.Z. Peng, H. Yao, J. Du, C. Ding and Z.H. Zhang	918