

Table of Contents

Preface and Organizing Committee

Chapter 1: Computer-Aided Design, Manufacturing and Engineering

Simulation and Optimization of a New Hydraulic Impactor H.Q. Zhao, P. Liu, M.F. Shu and G.C. Wen	3
Sheet Metal Forming Analysis of an Automotive Part Using Finite Element Simulation S. Suranuntchai and P. Kritboonyarit	11
Research on the 3D Modeling Method of Epicycloids' Bevel Gear Based on Pro/E C.X. Wang, F.J. Meng and J.Q. Zhang	15
Computer-Aided Front and Rear Wings Aerodynamic Design of a Formula SAE Racing Car M.N. Chen, W.H. Tang, B. Yang and X.J. Hu	20
A Novel CNC Grinding Method about Relief Surface of Corner Radius End Mill Based on a CAM System C.X. Zhao, F. Tang, S.Z. Li and X.H. Wang	26
Manufacturing of Removable Complete Dentures Using Vacuum Casting Technique W. Saidin, N. Kassim, Y. Yusof and Z. Ahmad Rajion	32
Study on Pulsed Eddy Current Nondestructive Testing Technology for Pipeline Corrosion Defects Based on Finite Element Method H.W. Liu, S.P. Zhan, Y.H. Du and P. Zhang	36
Passive Stereoscopic Display and Disassembly Simulation of Certain Shafting Components Q.Z. Tu, L. Qin and J.Y. Dai	42
The Research of 6-DOF Robot Reachable Workspace Z.J. Gou, H.Y. Yu, Y.K. Niu and Y.C. Xie	47
FEM for Brake Discs of SiC 3D Continuous Ceramic Reinforced 7075 Aluminum Alloy for CRH3 Trains Applying Emergency Braking L. Yu, Y.L. Jiang, S.K. Lu, H.Q. Ru and M. Fang	51
Finite Element Analysis of Temperature and Stress Distributions on Touching Area of Freight Train Wheel H.W. Liu, Z.Q. Li, Y.H. Du and P. Zhang	56
A Visible Framework for Virtual Prototype of Electric Tools J.W. Cui, Q. Gao, J. Li, X. Chen and X.L. Wang	61
Analyse of Flexible Assembly Cell via Software Witness M. Matúšová, E. Hrušková and K. Velíšek	65
FEM Analysis on a Rear Axle Housing Oil-Leakage Prediction of Four-Wheel Farm Transporters Based on COSMOS S.K. Lu, J.H. Su, S.D. Liao, J.Q. Su, B. Wang, L. Yu, Y.L. Jiang and S.H. Wen	70
Development of an Integrated System of Geometric Modeling and Machining Simulation of End Mill R. Li, X.F. Chen, G.F. Ding, J.J. Liu and X.B. Jin	74
Fatigue Strength and Modal Analysis of S195 Engine Crankshaft J.H. Wang, J. Hua and C. Li	81
Innovative Design and Static Analysis of Magnesium Alloy Automobile Wheel S.L. Han, L. Yang, G.S. Wang and Q.L. Zeng	85
A New Method of Data Processing Based on Geomagic Studio and Imageware in Reverse Modeling of Equipment Parts Q.Z. Tu, J.X. Zhao, D.Z. Su and J. Yan	89
Channel Mill's Top Shell Prototyping with the Single Point Incremental Forming Technology of Sheet Metal G. Liu	94
A Study on Developing Robustness Engineering by Using Stochastic Analysis Method D.W. Jung, B.C. Kim, D.H. Kim and D.T. Nguyen	102

Research on Efficiency and Stability of Computer Numerical Control Lathe H. Long, Y.X. Luo, X.L. Shen and B.C. Zhao	108
Assembly System Design with Modularity and CA Support Using A. Javorova, J. Oravcová and K. Velišek	114
The Establishment of a Prediction Model for Surface Roughness in Ultrasonic-Assisted Turning C.B. Yang, C.S. Deng and H.L. Chiang	119

Chapter 2: Innovative Design Methodology

Research on Motion Generation for Machining Axisymmetric Aspheric Concave Surface L. Zhang, Z.D. Huang, J. Zhao, S.J. Zhang and M. Zhou	129
The Experimental Research on Friction and Wear of the New Type Rock Bit Floating Ring Journal Bearing F. Xu, Z.G. Zhou and G.R. Wang	134
Design and Experiment of PVDF Transducer for Laser Ultrasound Detecting S.L. Geng, X.Q. Zhang and F.J. Li	138
Parameters Optimization for the Triplet High Voltage Disconnect Self-Elastic Contact Fingers Based on the New Cu-Cr Alloy Strip Y.M. Zhang, W.F. Liu, K.X. Song and Y. Zhang	144
The Study on Recovery Vehicle Scheduling Problem of Industrial Waste Recycling X.N. Zhang, H.M. Fan and J.S. Li	148
Integration System of Intelligent Design and Modeling Oriented to Requirement Configuration for Palletizing Robot Z.M. Li, W. Liu and J.Q. Li	154
Cultural Product Design Using a TRIZ Based Methodology E. Liu and W. Wang	159
Research on General Wheelchair Comfort Design Y.L. Yuan, T.M. Guan, X.Y. Tong and L. Lei	164
Face Data Acquisition and Error Analysis X.M. Cheng, C.J. Liao and Z.Q. Ye	168
Optimized Design of 1GYF-200 Sugarcane Leaf Shattering and Returning Machine's Cutter Roller J.M. Lu, M. Li, L.J. Wei, J.L. Wang, D.Q. Song, J. Zhang and Y.G. Deng	172
Optimal Design of Conjugate Cam-Linkage Combined Mechanism for Pressure Device in Die-Cutting S.H. Shen, X.D. Shi and Y.C. Yuan	178
A Study of High-Pressure Descaling Nozzle Jet Flow Characteristics by CFD Simulation C. Qian, Y.L. Chen, H. Jiao, C. Shen, H. Yan, M.Q. Wu and L.Q. Chen	182
Application of SPSS in Theoretical Mechanics Education H.B. Sun and T.T. Liu	186
Pattern Recognition of Chatter Gestation Based on Hybrid PCA-SVM Q. Shao and C.J. Feng	190

Chapter 3: Advanced Manufacturing Technology

Structure Analysis and Optimization for High-Speed Vertical Machining Tool Table F. Zhang, D.Q. Gao, Z.Y. Mao, J.M. Yi and H. Lin	197
A Comparison of Two Control Methods for Vehicle Stability Control by Direct Yaw Moment B. Lacroix, Z.H. Liu and P. Seers	203
Self-Heating in Monolith and U-Shape Microcantilever Hotplates M.Z. Ansari, W.J. Choi, M.Y. Lee and C.D. Cho	218
Stress Analysis on Projectiles Colliding into Sand Y.H. Jung, J.S. Youn, H.S. Bang, J.K. Kim, S.H. Park and W.C. Choi	222

Experimental Study on the Shaft Laser Cladding Bending and the Establishment of the Empirical Formula	
H. Zheng, G.D. Wang and Z.R. Han	226
Study on the Processing Technology of ERTI-7 Titanium Wire Based on AHP-PQ Model	
C. Zhang, R. Mo, H.C. Yang, X.J. Wang and X.R. Lu	230
A Study for the Mirror Surface Polishing by Using the Ring Shaped Tool	
S.Y. Wang	235
Study on Microstructure Defects of High-Carbon Wire Rod SWRH82B Drawing Fracture	
Y.L. Chen, C. Qian, X.W. Zha, J.H. Chen, H. Yan, M.Q. Wu and L.Q. Chen	239
Comparison of Dimensional Accuracy for Different Investment Casting Shells and Binders Based on Selective Laser Sintering	
Q.S. Yan, X. Xiong, G. Lu, H. Wan, C.C. Liu, F. Wang and X. Zou	243
Discussion Scanning Mode of Direct Laser Fabrication Quality Influence	
F.Y. Wang, W.J. Liu, H.Y. Bian, Y. Kong and Y.H. Zhao	248
The Expert System for Auto Programming in Coordinate Measuring Machines	
S.H. Pei and Y.M. Ma	254
Thermal Design of a Sealed Air Cooling Local Environment Control System for Precision Instruments In-Vehicle	
H.C. Li, F.F. Chen and Y.G. Dong	258
Stability Analysis for Pillars during the Process of Panel Mining Based on Dynamic Fuzzy Reliability	
S.J. Yang, H. Luo, J.Y. Dai and C.Z. Wu	263
Design for Turntable of Spray Rack	
W.H. Zhang and K.T. Li	269
Multivariate Statistical Process Control with Multi-Dots Alarm Rules	
H.Y. Wang	275
Effect of Ultrasound Action Modes on the Oxidation Resistance of Ni-Nd₂O₃ Nanocomposite Coatings	
X.H. Li, Y.J. Xue, D.Y. Zhang and J.S. Li	280
Research of Metallic Part Fabrication by Selective Laser Melting	
G.X. Chen and K. Guang	284
Application and Design of the New Steel Fiber RPC Column-Template without Demolition	
J. Wang and Z.W. Sun	288
Research on Modern Process Management Evaluation System	
L. Sun, A.Q. Sun, Z.Q. Ma, X.L. Wang, J.M. Fan and T.T. Xu	292
Deep-Hole Single-Edge Technology Test of Rigid Reamer	
X.Q. Shen, Y.M. Li and H.J. Zhang	296
The Application of SPC in the Motor Production Operation of the Air Conditioning Compressor	
Y.C. Xia and D. Xiao	304
Study on EDM Technics of Polycrystalline Cubic Boron Nitride Cutting Tool and PcBN Cutting Tool's Life	
Y.H. Jia	311
Structural Principle and Performance of Three Cylinder Hydraulic Confined Piston Engine	
D.Z. Yang, H.X. Zhang and T.Z. Zhang	316
Kinematics Analysis of on-Off Pressure Mechanism with Flexible Link for Offset Press	
J.Z. Guo, T.T. Cai and J.P. Yang	321
Research on the Lateral Vibration Characteristic of the Bogie in Dynamic Track Stabilizer with Track Irregularity Excitation	
L.H. Wang, G.W. Liu, A.N. Huang and Y.Y. Huang	325
Study on the pin Track of Four-Bar Linkage with Clearances	
Y.C. Yuan, Y. Li and X. Liu	329
Renovation Design of Coal Powder Conveyor Bearing Support	
H.T. Wang, S.F. Xu and L.P. Huang	335
The Application of Bond Graph Theory on Automobiles Modeling	
C.Y. Tang, X.Y. Hou, H. Yin and Y. Zhang	339

Mathematical Modeling and Experimental Verification of the Radial Stiffness for a Wire Race Ball Bearing	
X.B. Shan, L.L. Wang, T. Xie and W.S. Chen	343
Research on the Micro-Cutting of 0Cr18Ni9 Stainless Steel Films by Femtosecond Laser	
B. Xu, X.Y. Wu, S.Q. Ling, K. Yi, F. Luo, C.L. Du and X.Q. Sun	349
Calculation and Experimental Study of Fastening for Disc-Rotor	
M.J. Lu, H.P. Geng, G.H. Xu and Y. Lie	354
Control of Thermal Effect in Ion Beam Figuring Process Based on Low-Pass Filtering	
Z. Yuan, Y.F. Dai, H. Yu, X.H. Xie and L. Zhou	360
A Research on Surface Morphology of Cutting of Titanium Sheet with Water-Jet Guided Laser and Conventional Laser	
C.Q. Li, L.J. Yang and Y. Wang	366
Design of Docking Probe Based on Dynamics Model of Flexible Beam Impact	
X. Zhang, Y.Y. Huang, W. Han and X.Q. Chen	371
Optimization Design of Vehicle Front Suspension Structure Parameters Using DOE Method	
J.Z. Feng, J.T. Song and W.H. Zhu	375
Established and Experimental Study of ELID-Ultrasonic Honing System	
J.C. Kuai	381
Study on the Construction Process Control Claims Management	
C.B. Chen and D.C. Wang	385
Analysis of Adaptability of Manipulator for Grasping Apple by Cable-Driven Pneumatic Pressure	
Z.Q. Li, J. Zhang and G.Y. Liu	389
Strength Analysis of a Naval Gun Bracket in Marine Combat Conditions	
B.B. Hua, J.S. Ma and D.L. Wu	393
Seismic Damage Analysis of RCC Gravity Dams Using 3D Nonlinear FEM	
Z. Li and L.X. Zhang	397
The Study of the Precision Grinder Bed Thickness with Artificial Granite Composite	
Y. Wang, J. Li, K. Song and B.Q. Ye	403
Feature Extraction from Engine's Data Based on Rough Sets Theory	
F. Wang and L.X. Jia	410
Moving Path Analysis of a Cannonball Colliding onto Water	
J.S. Youn, Y.H. Jung, H.S. Bang, H.S. Lee, Y.S. Cho and W.C. Choi	414
Simulative Analysis of Carry Out Fontusing near Field Photolithography	
C.B. Yang, H.L. Chiang and C.C. Chen	418
Influence of Surface Texture on Lubrication Performance of Hydrodynamic Journal Bearing	
S.H. Wang, X.Y. Wu and J.H. Zheng	426
Production Management for Manufacturing Based on Activity-Based Costing	
Y.H. Liu and S.L. Gong	432
Reliability Analysis of Radial Tire	
C.S. Zhu, G.L. Wang, P.P. Li and R.Y. Ma	436
The Novel Calibration Method for 3-DOF Measurement System	
K.I. Lee, J.S. Jang, H.W. Lee, S.J. Kim, S.R. Lee and S.H. Yang	440
Modal Analysis and Optimization Design on a Vehicle-Load Rectangle Liquid Containers under Fluid-Structure Coupling	
N. Liu, J. Zhao, H.W. Zhang, X. Huang and J.L. Liu	444
Digit Expression for Structure of Planar Gear Trains	
J.F. Sun, D.X. Zhao and Y.H. Yin	448
Dynamics Modeling and Simulation of Collision and Impact Test Machine Based on Baby Carriages	
Z.M. Wang, C.H. Zhu, D.M. Tang, J. Yuan and X.C. Xu	452
Product Life Cycle-Oriented Cloud Process Management Research	
L. Sun, J.M. Fan, Z.Q. Ma, X.L. Wang, H. Tan, A.Q. Sun and T.T. Xu	456
Causes Analysis and Counter Measures to Bad Riveting of the Top Cylinder Head of the Compressor	
Y.C. Xia and B. Cao	460

Microstructure and Properties of Mo-Based Composites Reinforced by Al₂O₃ S.Z. Wei, L.J. Xu, G.S. Zhang, J.W. Li and B.Z. Dai	467
Air-Cooled Mn-Series Bainitic Steel as 5Mn2SiNbTi of Grade YS 415 to 550MPa for Seamless Steel Pipe C. Feng, Z.X. Shen and Y.K. Zheng	471
Effects of Sb on Microstructure and Mechanical Properties of Magnesium Alloy ZA63 Y.G. Wang, Q.A. Li and Q. Zhang	475
Relationship between Modal/Cotton Blending Ratio and Heat-Moisture Performance S. Cong and B.Z. Ke	479

Chapter 4: Equipment Manufacturing

Inside Temperature Monitoring System of Marine Reefer Containers Based on RFID J. Ji and H.D. Han	485
A Force-Feedback Assembly Method for Micro Parts Based on SRNN L.H. Zhao and J.C. Zhang	489
Ionizing Radiation Testing System for Emerging Semiconductor Materials and Devices X.L. Hu, J.K. Gui and C.Z. Zhao	495
Optimized Design of Sun Position Detection Sensor Y.N. Zhong, L.X. Zeng, S.T. Ding and X.L. Zhang	499
Simulation of Micro-Bolometer Using Double Sacrificial Layers Structure Q.X. Jian, J. Wang, K. Yuan, Z.Q. Peng and Y.D. Jiang	504
The Industrial Application of Dynamic Soft-Reduction Technology on the No.1 Slab Continuous Caster in No.2 Steelmaking Plant of Xinyu Steel Y.W. Kong, K. Feng, Z.W. Han and J.F. Cao	510
A Novel Comparator Circuit of Single-Electron and MOS Transistors Y.J. Zhou, C.H. Xiong and C.B. Lu	516
Improved Algorithm of Image Scaling Based on Edge Features and its VLSI Implementation H.F. Sun, S.F. Lu and S.L. Chen	520
Research on Small Synchronous Generator Excited System Based on Fuzzy Control G.Z. Wang and W.X. Wang	524
Study on Establishing Regression Model to Predict Leg Girth of Young Women Y.J. Zhang, F. Yuan, J. Sun, J.F. Jin and F.Y. Zou	528
Research on Automatic and Rapid 3-D Modeling for Flow Field of a Control Valve Y.R. Zhang, Y. Wang and C.D. Li	533
An Active Control Method for Chaotic Motion of Fluid Conveying Pipe under Harmonic Excitation of Supports R.D. Bao	537
The Simulation Research on Pressure Control System of the High-Speed Train's Carriage X.M. Hou and X.J. Zhang	547
Quantitatively Calculated Parameters Configuration of Concrete Pump Accumulator A.L. Wang, Z.Q. Shi, Y.Q. Hu and C.X. Yuan	551
New Structures and Materials for Next Generation Photonic Technology D.H. Zhang, T. Mei, D.Y. Tang, X.C. Yuan and T.P. Chen	556

Chapter 5: Automation Equipment

Research on Joint Simulation and Modeling of Electro-Hydraulic Position Servo System Based on Simulink and AMESim B.Q. Jin, D.B. Chen and H. Cheng	563
The Kinematics Analysis of Bulldozer Multi-Freedom Working Device F.S. Zhang and G.N. Xu	567
Research on an Embedded Servo Control System of Micro-EDM G.Z. Yang, F. Liu and H.B. Lin	573
Research on the Unattended Control System of Coal Belt Conveyor J.G. Wang	578

Grey Modeling Method of Wear Prediction for Reciprocating Machinery Based on Spectrum Analysis	
L.Y. Wang, X.L. Xu and G.X. Wu	582
Numerical Analysis on Internal Flow Field in Stator of a Torque Converter	
Y. Liu	587

Chapter 6: Other Related Topics

Study on the Impact of the Cutting Process of Wire Saw on SiC Wafers	
X.Y. Wang, Y. Li and S.J. Li	593
Effects of Aluminum Oxide on Combustion Behavior of Intumescent Fire-Retarded Polypropylene Composites	
S. Hu, H. Jing and J. Zhang	598
Projects in the Optimal Allocation and Management of Construction Equipment	
T.X. Yang, S.T. Yang and M.W. Peng	603
The Application Study on Virtual Lab InMicro-Control System of Experimental Teaching	
L.X. Li, D.K. Ding and J.F. Li	609