

Table of Contents

Preface

Theoretical and Experimental Study on the Surface Roughness of Quenched Steel in Ultrasonic Turning with PCBN Tool F. Jiao, J.H. Jian and X. Liu	1
Application of Reverse Engineering to Product Development T. Mochizuki	5
Design and Analysis of Folding Linkage Based on Five Functional Medical Bed G.P. Zhang and J.B. Zhang	9
Numerical Simulation of High-Aspect-Ratio Micro-Hole Electroforming with External Magnetic Field W. Li, P.M. Ming, W.J. Jiang and Y.D. Lv	13
Dynamic Optimization of the Spindle-Cutter Coupling System X.S. Gao, Y.D. Zhang and Q. Wu	17
Study on RSM Procedure of Straightening Process for Aeronautical Component Based on Finite Element Simulation H.W. Zhang and Y.D. Zhang	22
The Design of Compact Five-Coordinate Measuring Machine Z.G. Fei, J.J. Guo and G.F. Luo	26
Change of Plastic Hinge Position in Radial Ring Rolling without Guide-Roll Y.X. Hao, S.J. Shi, L.Y. Yang and S.W. Yang	30
Research on Vibration Stress Relief Based on FEM C.M. Li and F.K. Cui	35
Practical Optimization Algorithm for Discrete Variables D.S. Wang and A.P. Zhou	39
Flow Characteristic of Axial Piston Pump with Conical Cylinder Block L. Li, M.H. Xu, J. Ke and L.Y. Yu	43
Experimental Study and Finite Element Analysis of the Performance of Reciprocating Seal in Rapping Device of Gasifier J. Yu, J.Y. Gao, W. Lin, C.G. Wang, Y.Y. Wu and J.M. Xu	48
Configuration and Motion Simulation of Multi-Legged Walking Robots with Hand-Food-Integrated Mechanism Arm X.J. Wang, L.W. Wang, W.G. Tang and X.H. Zhang	54
Analysis and Calculation of High-Precision Heavy Machinery's Main Driving System for Dynamic Disturbance between Torsional Vibration and Microscale Effect W. Zhao and D. Huang	59
Hybrid Projective Synchronization of a New Hyperchaotic System J. Fang, X.M. Zhang and C.S. Jiang	63
Design and Manufacturing of Air Conditioner Panel Hot Runner Injection Mold Based on CAD/CAE/CAM Z.G. Jin, W.J. Jiang and M.X. Yu	68
Fault Diagnosis of Emulsion Pump Valve X.M. Han	73
Research and Application of Subsidiary Transport in Mines Based on Flexible Surge Bin Design L.R. Wan and Z.C. Wang	77
Optimization Design of Automobile Suspension Springs Based on BP X.H. Shi, H.L. Gao and M.H. Xu	82
Study on Real-Time Image Capture Method for Apple Sorting System J. Li, B. Wang, D.X. Zhang and B. Liu	86
Research on 3C Integrated System of CBN Turning Tool for Small and Medium-Sized Enterprises N.B. Liu, Z.Y. Wu, G.Y. Li, S.L. Hu and C.L. Yang	91
Research of Rolling Mill Friction Quivering Properties Based on the Rolling Interface X.B. Fan, H.G. Wang and Y. Zang	95

Research and Application on Reverse Engineering of Tooth Surfaces of Hypoid Gear L.M. Zhang and L.X. Nie	100
Strain Intensity of the Roller Parts under Cyclical Deflection and Cyclical Plastic Deformation Z.C. Wang, A.R. Liu and X. Wang	104
Wear Mechanism of Tool Head in Ultrasonic Polishing without Abrasives C.S. Liu and Y.H. Li	110
Simulation and Analysis of Cutting Tools Corner Radius in Cutting Process Z.W. Dong, X.H. Wan and S.Y. Liu	114
Multidisciplinary Design Optimization of a Lunar Lander's Soft-Landing Gear Y.T. Lu, C.J. Wang, A. Li and H. Wang	118
Automatic Acquisition and Testing System for Air Compressor Performance Z.X. Tie and L.J. Zhao	122
Research on the Topography Feature of the Diamond Grinding Wheel under Elliptical Ultrasonic Assisted Dressing with Diamond Stylus Q.C. Wang, N.F. He, G.F. Gao and B. Zhao	126
Tribological Behaviors of Chromium Steels Sliding against Brass in Different Gases M. Qiu, J.F. Yan and Y.C. Li	131
The Influence of Rotor Bar Wear of Impact Crusher on Impact Effect S.J. Cao, H. Zhang and S. Li	135
Reliability Analysis of Deployment Mechanism of Solar Arrays H.C. Wu, C.J. Wang and P. Liu	139
Experimental Study on the Subsurface Damage in the Ultrasonic Vibration Grinding of Nano-ZrO₂ Ceramics M.L. Zhao, B. Zhao, Y.Q. Wang and L.Z. Kong	143
Research on Stress Method of Vehicle Suspension Springs and Finite Element Modeling X.H. Shi, M.H. Xu and H.L. Gao	147
3-D Optimization of Self-Balanced Torsion Bar Diameter and its Fillet Radius by FEM L.F. Wu, X.C. Yin and Z.H. Liu	151
Test Investigation on Autonomous Scooping Control Strategy of Wheel Loader H. Zhang, S.J. Cao and S. Kazuhiko	156
Analysis of Pressure Vessel Manufacturing Technology Development P. Chen and J. Ma	160
Research on Mechanism of Ultrasonic Assisted Creep Feed Grinding Ceramic Blade Surface J.X. Zheng	166
Experimental Research on Ultrasonic Assisted Pulse Electrochemical Compound Finishing for Hard and Brittle Metal C.G. Zhang, X.L. Yang and B. Zhao	170
The Lower Control System Development of 3 DOF Parallel Machine Tool CNC System Based on DSP T.H. Gao, R. Li, S.Z. Yang and Y. Zhuang	175
Developing History and Trend of Mine Support Equipment in China T.L. Xue, X.H. Zhang and D.T. Du	179
Research of Fault Warning System of the Cooling Tower Fan Blade J.P. Chen and W. Dong	183
Filtration and Pulse Cleaning System for Particle Removal from Gas H.X. Li, Z.J. Sun, L.J. Zhao and Z.X. Tie	188
Simulation Analysis for Rotor's Strength of Impact Crusher Q. Wang and H. Zhang	192
Static Analysis on Slewing Bearing with Negative Clearance Based on ANSYS M. Qiu, J.F. Yan, L. Chen and B.H. Zhao	196
Establishment of CSCD in PTC Environment Y.F. Li, H.H. Mou and J.G. Yu	200
Study on Grinding Force in Two-Dimensional Ultrasonic Grinding Nano-Ceramics X.D. Li and Q.C. Wang	204
Identification of Fractal Scale Parameter of Machined Surface Profile D.S. Li, Y.D. Zhang, Q. Wu and P. Wang	209

Patran Based Results Processing System for Spacecraft Mechanical Analysis B. Wang, C.J. Wang and H.C. Wu	215
System Design of Cam Mechanism Based on Follower Structure and General Kinematic Laws L.W. Wang, A.S. Li, D.Q. Zhang and W.G. Tang	219
Digitalization and Meshing Performance Analysis on Tooth Surfaces of Hypoid Gear L.X. Nie and L.M. Zhang	224
Surface Modification of Polypropylene Melt Blown Non-Woven Using Atmospheric Pressure Dielectric Barrier Discharge Plasma Y. Zhang and Y.D. Lv	228
The Influence of Modeling Methods on the Meshing when Solid Element Was Used in ANSYS - Taking the Design by Analysis of Dry Welding Experiment Module as an Example T. Lv, J. Zhao and L. Xue	232
Developing History of Water Hydraulic Technology and its Application in Coal Mine Production J.A. Zhu and P.H. Guo	236
Cutting Force Model of Aluminum Alloy 2014 in Turning with ANOVA Analysis Y.J. Ma, Y.D. Zhang and X.C. Zhao	242
Development and Application of CAD/CAE Technology in China Coal Mine Machinery Equipment P.H. Guo and J.A. Zhu	246
Based on the Online Monitoring and Fault Diagnosis System of the Main Hoist for Mine Z.Y. Pan, Q.C. Wang and W.H. Ren	250
Load Bearing Capacity of Oil Film Bearing Research H.C. Fan, J.L. Tong, X.H. Yi, J.B. He and J.X. Yang	255
Surface Phase Transformation Analysis of Nanozirconia Toughened Alumina Ceramics under Two-Dimensional Ultrasonic Vibration Grinding Y.Y. Yan, P.L. Xu and B. Zhao	259
SPC-Based Real-Time Control Method for CNC Machining Quality X.L. Kang, D.M. Yu, X.L. Yang and D. Wang	263
A CPD-Ontology Built in IDEF5 for Product Development K. Lv and Q.L. Zeng	268
Development of the Automobile Steering System A.J. Hu	272
Research on Forms of Grinding Allowance Based on NC Form Grinding Cylinder Gear H.X. He	276
Design and Test of the Plate Type Plug Seeder Based on Magnetic Attraction Y.J. He, B. Liu and W.Z. Wang	280
The Simplest Mathematical Model and Simultaneous-Control Structure for Hobbing Helical Non-Circular Gear F.Y. Tian, C.B. Hu and Y.C. Jiang	284
Development of Pile-Extractor Machine of Water Jet L.F. Wu, X.C. Yin and M.Q. Geng	289
Study on the Thermal Effect of Adding Coal Cinder to the LCZ of Solar Pond H. Wang, J.L. Liu and J.N. Zou	294
Design and Development on the Processing and Managing System of Spaceflight Products Analysis and Experimental Data Y.T. Liu, C.J. Wang and B. Wang	299
Research on Characteristics of Damping Force of Hydro-Pneumatic Suspension B.Z. Lü, A.J. Hu and S.H. Zhu	303
Control System Design Based on CANopen Network for Multi-Legged Robot with Hand-Fused Foot Y.X. Zhang, X.Q. Zeng and X.J. Wang	307
Research on Grinding Temperature of Nano ZrO_2 Ceramics Using Diamond Grinding Wheel Dressed by Elliptic Ultrasonic Vibration J.X. Xue and B. Zhao	313
Investigation on the Motion States of the Hammers while Hammer Mill Steady Running by High-Speed Photography B. Liu, D.X. Zhang and L. Zong	317

Experimental Study on Two-Stage Cascade Low Temperature Pre-Cooling Equipment X.F. Liu, F.H. Wang and F.M. Meng	322
Two Hourglass Control Methods for Dynamic Analysis in Cold Ring Rolling Process Q.Y. Tan, X. Zhao and X.B. Zhang	326
Research on the Characteristics of Data Transmission of Wireless Network J.L. Liu, H. Wang and Y.Y. Yan	331
The Process Study on Laser Heat Treatment for CNC Machine Tool Guide H.L. Su, X.P. Miao and Y. Zhang	335
Study on Reliability Tests to a Few Samples of Mechanical System S.Y. Guo and Y.Q. Qi	339
Recognition of Crack Damages Based on Wavelet Transforms C.Y. Li, S.K. Zhang and X.Q. Cheng	343
Analysis and Strategy on Gear-Shape Error H.Q. Gao, S.W. Wang and Q.G. Chen	347
Application Analysis of Vortex Tube Temperature Difference Phenomenon in High-Temperature Cyclone Separator W. Sheng, X.F. Liu, H. Wang, Z.W. Gao and R.C. Liu	351
Experimental Study on Ultrasonic Milling Acoustic System Z.D. Li, B. Zhao and J.J. Ma	355
Research on Dynamic Measurement of the Residual Stress in Thick Pre-Stretched Aluminum Plate 7075T7351 Z.W. Dong, X.H. Wan and S.Y. Liu	359
Study on Surface Quality of Al/SiCp Composites with Ultrasonic Vibration High Speed Milling D.H. Xiang, X.T. Zhi, G.X. Yue, G.F. Gao and B. Zhao	363
The History and Prospect of ERP Application of Chinese Manufacturing Enterprises W.J. Jiang, J.B. He and Z.G. Jin	367
Study on Fault Diagnosis for Turbocharging System of Diesel Engine Based on Support Vector Machine X.M. Zhang and D.H. Chen	371
The Lateral Vibration Analysis of the Machine Drive Screw H.D. Zhang	375
Model Analysis of Disk Spring Based on ANSYS W.X. Li, X.B. Wang and L.M. Sun	380
Data Communication Methods for the Fault Diagnosis Instrument System D.P. Zhang, H.L. Zhu and Y.G. Shi	386
Study on the Constitutive Model of the ARB Specimen and Simulation for ARB Process Z. Wu, L.L. Liu, G.Z. Zhang and J.J. Xi	391
Logarithmic Spiral and its Application to the Design of the Relieving Shaped Milling Cutter X.X. Xu, X.H. Zhang and Y.Y. Zheng	396
NC Application in Rolling Machining of Special Section Tube S.F. Nie, Z.D. Geng and Y.L. Yu	400
Research of Automatic Camshaft Detection and Data Processing Technology L.J. Zhong and J.L. Tong	404
Design of Face Gear Drive with Spur Pinion and Experimental Test J.L. Tong, Y.B. Shen and X.B. Wang	408
Research on Data Processing Method of the CAD/CAM Integrated System of Super-Hard Cutting Tools Q.L. Niu, Z.Y. Wu, N.B. Liu, S.L. Hu and C.L. Yang	413
Automatic Monitoring System of Centrifugal Fan Performance B.G. Gao, H.X. Li, X.P. Wen and F.H. Wang	417
Study on the Stress Field in Ultrasonic Grinding Engineering Ceramics X.B. Wang, H.Q. Gao and G.F. Gao	421
Stator Structure Optimization of Cylindrical Bending-Type Ultrasonic Motor Z.Y. Wang, B. Liu, X.Z. Cao, Z.Y. Deng and B.C. Ren	426
The Transformer Simulation and Performance Testing in Ultrasonic Vibration Assisted Grinding System J.G. Yao, B. Zhao and Z.F. Jia	431

Relationship between Electrical Parameters in Combined EDM and Surface Quality X.L. Kang, D.M. Yu, H. Guo and C.P. Shang	436
Thermodynamic Analysis of Interfacial Reaction between Diamond and Ni-Cr Alloys Z.B. Yang, G.B. Zhang and J.H. Xu	440
Research on Crack Mechanism of Surface/Subsurface Based on Grinding Stress Field in Ultrasonic Grinding Nano-Ceramics C.Y. Zhao, X.D. Li and F. Jiao	444
Experiment Study and Finite Element Analysis of Single-Axis Acoustic Levitator B.Y. Du, X.Z. Xu and B. Zhao	449
Optimization Design of Coordinate Measuring Machine Based on ANSYS Software Y.G. Yan, Y.Q. Li and Z.K. Wang	453
Experimental Study on Surface Quality of Al₂O₃ Engineering Ceramics in Ultrasonic Drilling and Grinding C.J. Zhang, C.S. Liu and B. Zhao	457
Design and Analysis of Office Air Conditioning System of Distributed Independent Air Supplying X. Yu and B. Yuan	461
Numerical Simulation of Fluid Dynamics in a Two-Dimension Gas-Solid Bubbling Fluidized Bed T. Zeng, X. Zhang, H.B. Lin, M. Zhou and K. Cheng	466
Research on the Definition of Armature Components Composite Stiffness H.F. Wang, G.L. Wang and Z.S. Lu	471
Simulation on the Wear of Micro Mill Cutter in Micro Milling H.J. Hu, Y.Z. Sun and Z.S. Lu	476
Pneumatic Measurement Approach for Form Tolerances of Inner Hole in Spool Valve J. Liu and G.L. Wang	480
Forming Ceramic Coating on Al2024 by Scanning Micro-Arc Oxidation P.X. Lv, S.C. Di, G.X. Chi, D.B. Wei and J.C. Liu	485