Table of Contents

Preface / Organizers	
Establishment of Relatively Unified Mathematical Model for Spiral Surface Based on Movement Characteristics of Particle L.Z. Song, S.L. Guo, C.J. Xiang and Q. Hong	1
Virtual Assembly System Based on PRO/E and Topological Relationship J.L. Song	6
The Research of CAE Template and Knowledge Reuse Technology for NC Machine Tool Generalized Modular Design System L. Mi. C. F. Vin, H. Figng, K.V. Zhang and L. Wang.	11
L. Mi, G.F. Yin, H. Jiang, K.Y. Zhong and J. Wang Research on Intelligent Tracking Control Technology for a Photoconductive AGV L.L. Pu and X.D. Zhang	18
Analysis of Modality of CK61125 CNC Lathe Spindle Box J.X. Yang, M. Yang, F.K. Cui and H.Y. Xu	23
Research and Correction on Cone Angle Effect of CBCT F.S. Zhang, X.Z. Deng and F.K. Cui	28
Numerical Simulation Analysis of Temperature Field for Motorized Spindle of High-Grade CNC Machine Tool Based on ANSYS C.Q. Li, X.D. Zhang, Q. Zhang and H. Li	33
Detecting System Design of Tactile Sensor for the Elderly-Assistant & Walking-Assistant Robot	
X.D. Zhang, X.J. Wei and J.J. Zhang	37
Research on Robot Vision Technology Based on ARM and DSP for Age and Disabled Helping Robot C.Z. Wang, X.D. Zhang and X.Z. Wu	42
Study on Open Standard Control System of Walking Assistant Robot for the Elderly X.Z. Wu, X.D. Zhang and C.Z. Wang	47
$\begin{tabular}{ll} \textbf{Method of Network Manufacturing Alliance Building Based on Service Resources Matching Y. Liu, Y. Li and S.J. Li \\ \end{tabular}$	52
Tool Cutting Edge Line Detection Based on Improved Hough Transform P.Y. Li, Y. Li, J.M. Zheng, D. Zhang and C.Y. Hao	59
Quality Control and Tracing System of Automotive Airbag Flexible Assembly Line X.J. Shi, F.T. Li, Y. Zhang and Z.D. Gao	66
Thermomechanical Finite Element Simulation of Cutting Force and Temperature in Ultrasonic Aided Turning of Hardened Steel F. Jiao, Y. Zhao, J.H. Jian and X. Liu	72
Micro-Displacement Measurement with High Accuracy for Micro-Motion Stage Based on Computer Microvision Y.B. Fan, Q.H. Lu and X.M. Zhang	76
Influence of Prestrain on Output Characteristic of Dielectric Elastomer Film Actuators L.H. Zhu, X.L. Zhu, S.J. E, A.F. Hui and J.B. Cao	81
Research on Multi-Axis High Speed Machining Milling Force of Aeroengine Impeller Y.Y. Guo, C. Zhao and W.G. Du	87
Conjugate Meshing Roller Chain for Timing Mechanism Y. Wang	92
Experimental Research on the System Performance in Near-Dry Deep Hole Drilling H.B. Zhao and Y.F. Nan	98
Study on the Node Position of Stepped Horn Used for Power Ultrasonic Grinding B. Zhao, L.Z. Kong and C.Y. Zhao	103
A Spool Displacement Control System of Proportional Valve Based on Digital Observer X.B. Kong and H.Y. Wang	110
Experimental Research on Electroactive Characteristics of a Novel Artificial Muscle Material-Dielectric Elastomer A.F. Hui, S.J. E. X.L. Zhu, L. H. Zhu, and J.B. Cao	116

A Intelligent Wheelchair Obstacle Avoidance System Based on Multi-Sensor Fusion Technology	
Y. Zhang and J. Chen	121
Dynamics Characteristics of High Speed Ball-End Milling Cutter for Machining Hardened Steel	
B. Jiang, M.L. Zheng, J. Zhou and D.H. Xia	127
Research on NC Dressing of Involute Grinding Wheel X.Z. Ren, Y.H. Wang and J.X. Su	132
Prediction of Critical Cutting Conditions of Adiabatic Shear in Orthogonal High Speed Cutting Based on Linear Pertubation Analysis G.H. Li, M.J. Wang and Y.J. Cai	137
Investigation of Laser Scribing Technics for Reducing Core Loss of Grain-Oriented Silicon Steels Y. Huang, Y. Liu and G.L. Zhu	141
Sequential Fluid-Structure Interaction of a Large-Scale Gas Control Valve F. Cao, Y. Wang and Y.T. An	146
Analysis of Lead Screw High-Speed Roll-Beating Forming Y. Li, L. Zhang, M.S. Yang and Q.L. Yuan	151
Research on the Fracture Phenomenon of Zirconia-Toughened Alumina Ceramics under Ultrasonic Vibration Y.Y. Yan, B. Zhao and J.L. Liu	156
Preliminary Research on the Post Treatment of Fluid Magnetic Abrasivetool W.D. Li, M. Lv and S.Q. Yang	161
A Novel Electro-Discharge Dressing Technique for Nonelectrical Diamond Grinding Wheels L.R. Cai, J.H. Yu and Z.M. Wan	165
Copy Geometry Modeling Method for Complex Components with IGES Reference Models B.H. Lu, K. Wang, B.Z. Qu and X.F. Zheng	169
Research of Magnetic Induction Intensity on Magnetic Abrasive Finishing W.H. Li, H.L. Chen, S.Q. Yang and S.C. Yang	174
Research on the Automatic Programming System for Industrial Robots in Free-Form Surfaces Polishing J.M. Zhan, Q.T. Liu and G.M. Wang	181
Design of a Rudder Actuator Electric Loading Test System X.D. Pan, G.L. Wang, J. Zhang, L. Sun and H.J. Liu	186
Experimental Study on Dry WEDM Finishing T. Wang, F. Qiu, C.Q. Wang, G.Z. Zhang and X.C. Xu	190
Investigation of Complex Signal and its Bilateral Frequency Spectrum K. Wang and H.R. Zhang	194
Quantitative Analysis of the Extrusion Process of AZ31 Magnesium Alloy Based on Rough Set Theory and 3DFEM Simulation Y. Lou	200
Research on the Character of a Synchronous Control System with Wireless Data Communication	
J.L. Liu, Y.Y. Yan and G.Q. He	206
Research on the Finishing Mechanism of Fluid Magnetic Abrasives H. Zhang and W.D. Li	211
Preparation and Properties Study of Laser Cladding of Ni-Based Alloy on Copper Y.S. Wang, F.D. Zhu and N.W. Liu	216
FEM Investigation of Machinability Properties of SiCp/Al Composites L. Zhou and S.T. Huang	220
Evaluation of Tool Wear when Milling SiCp/Al Composites S.T. Huang and L. Zhou	226
Intelligent Fault Diagnosis of the Control Valve with High Flow Rate Y.R. Zhang and Y. Wang	232
Manufacturing Plant Management Information System Analysis and Design Based on UML X.Y. Yang, H.B. Zheng and Z.W. Zhang	237

Research on Scheme Design of Four-Axis Machining Centers Based on Topological Structure and Tool Changing Motion Characteristics	2.42
J.H. Liu, B. Zhao and H.S. Yan Cutting Mechanism Study on Technology in Near-Dry Deep-Hole Drilling	242
P. Hai and H.X. Wei	251
Research on Interpolation Control of 6-DOF Water Cutting Robot M.H. Xie and W. Wang	257
Study on Cutting Force and Tool Wear of High Volume SiC/Al MMCs with Ultrasonic Vibration High Speed Milling D.H. Xiang, G.X. Yue, X.T. Zhi, G.F. Gao and B. Zhao	264
Microelectrode Fabrication by Electrochemical Turning Y.K. Wang, X. Li, H. Chen, Z.L. Wang and D.B. Shan	269
Experimental Study of Micro-Electrode Array by Micro-WEDM X.S. Geng, Y.K. Wang, Z.L. Wang and D.B. Shan	274
Laser Cladding ZrO ₂ Reinforced Coating and its Corrosive Wear Behavior in the Strong Alkaline Solution	
S.C. Zhang, X. Li and J. Zhang	279
Study on Acoustic System Designing of Two Dimensional Ultrasonic Polishing without Abrasives	202
C.S. Liu, J.X. Zheng and Y.F. Liu Basic Research on Ultrasonic Extrusion for 45 Steel Shaft	283
J.X. Zheng, C.S. Liu and Y.M. Zhang Evnevimental Study on Deep Hole Drilling Commo Titanium Aluminida	288
Experimental Study on Deep Hole Drilling Gamma Titanium Aluminide L. Zhu, X. Chen and B. Viehweger	293
Research and Implementation of Automatic Camshaft Measurement Technology L.J. Zhong and J.L. Tong	297
Drilling Characteristics of SiC Particle Reinforced Aluminum-Matrix Composites with Ultrasonic Vibration	
X.X. Xu, X.H. Zhang, C.S. Liu and B. Zhao	302
Cutting Parameter Optimization Based on Force and Heat Constraint in Milling TC4 Titanium Alloy X.H. Zhang, X.X. Xu, M. Chen, B. Rong and G. Liu	307
Experimental Study on Vibration Characteristics of Acoustic System in Ultrasonic	
Vibration Lapping C.J. Zhang, C.S. Liu and B. Zhao	313
Geometrical Optimization Searching Algorithm for Evaluating Conicity Error X.Q. Lei, Y.J. Xue, J.S. Li, W. Ma and M.D. Duan	320
Research on Image Detection Platform of Embryo Vaccine T.C. Xie, J.J. Zhai, X. Nan and Z.Y. Hu	327
Two Stage Segmentation Method Based on Triangular Mesh Model M.D. Duan, Z.Y. Zhang and J.T. Cheng	331
Research on Measuring the Micro-Table Position and Pose Based on Binocular Vision S.G. Yang, H. Li, Y.J. Xue, H.L. Zhu and J.S. Li	335
3D Parametric Design for Steel Headframe of Coal Mine Based on Solidworks F. Wei and F.R. Wang	340
Temperature Field Simulation of Anode Erosion in Electric Discharge Machining B.C. Xie, Z.L. Wang, Y.K. Wang and J.Z. Cui	345
Application of Finite Element Analysis in Automotive Wheel Design J.P. Liu, B.Y. Ye and G.W. Li	350
Experiments and Analysis of Near-Dry Deep-Hole Drilling System P. Hai and F. Yuan	355
Ultrasonic-Vibration Hard Cutting Force Analysis with the Finite Element Method J.L. Tong, Y.Y. Yan and B. Zhao	360
Problems and Countermeasure Research of Modern Coal Enterprises to Implement ERP W.J. Jiang and Z.G. Jin	365
Gray Clustering Evaluation Method of MIE on Combinative Weight-Fixing Y.F. Li, H.H. Mou and K. Lv	369

Roughness Detection Based on 3D Shape Reconstruction of Workpiece Surface Micro-Vision Image J.M. Zheng, B. Guo, M.S. Yang, Y. Li and X.N. Wang	373
Experimental Study on Cutting Force in Machining Nickel Base Superalloy X.Y. Wang, S.Q. Pang and Q.X. Yu	379
CNC Machining Methods of Drum with Fold Line Grooves H.B. Han, Z.D. Shang and J.S. Li	383
The Simulation on Pro/e of Blique Plane Double-Enveloping Worm Gear	388
Y.M. Zhang, S. Lu and G. Xie Joining of Diamond Grains to Medium Carbon Steel with Ni-Base Powder during Laser	300
Brazing Z.B. Yang, A.J. Liu and J.H. Xu	392
Structural Topology Optimization of the Column of Form Grinding Machine S.G. Yao and H. Li	397
Simulation and Experiment of New Whole Vibrator for Ultrasonic Vibration Internal Grinding System	402
Z. Yin, H. Li, Y. Li and O. Xie Effects of Oscillation Frequency on the Tribological Properties of Self-Lubrication	402
Spherical Plain Bearings with PTFE Woven Liner M. Qiu, Z.L. Gao, S.J. Yao and L. Chen	406
Parametric Design of Tractor Configuration Using API Based on CATIA J.S. Li, L.H. Chen and L. Li	411
Research on Dynamics Simulation of Milling Process for Frame Guide Plate Surface of	
Marine Diesel Engine X.F. Fang, C.Q. Wu, S.W. Zhang, W. Jia, C.Q. Yang and Y.H. Tong	417
Life Prediction of Bearings Based on Fuzzy Theory X.Q. Wang, F.K. Cui and G.B. Wang	422
Oxidation and Wear Resistance of Ni-Y ₂ O ₃ -ZrO ₂ Nanocomposite Coating Prepared by Ultrasonic Electrodeposition Y.J. Xue, C. Shen, J.S. Li and Y. Liu	427
Research on Frictional Wear Property of the High Vanadium High Speed Steel in Conditions of Low Slip-Roll Ratio	127
H.M. Chen, L.J. Xu and H.G. Wang	431
Research on Establishing Assessment Datum Plane of Three Dimensional Surface Micro- Topography F.K. Cui, Y.X. Li and X.Q. Wang	435
Development of a Kind of Miniature Pressure and Vacuum Compressor for Built-In Robot	733
Wrist J.H. Han, B.J. Guo and S.S. Zhao	439
Discussion on Electromagnetic Radiation Protection Standard of Light Industrial Equipments	
Z.Q. Zhang, G.Y. Yu, S.B. Chen, Z.D. Zheng, R.D. Li and Y. Li	444
The Suction Characteristics Simulation of Electromagnet Based on Maxwell X.L. Cheng, L.C. An and K. Guo	449
Research on Processing Parameters of Large Lathe Bed's Vibratory Stress Relief J.X. Yang, Y.Z. Cheng, F.K. Cui and H.Y. Xu	454
A New Method of CMM Inspect Path Planning for Precision Generalized Helicoid W.M. Pan, Y.J. Yu, J.S. Li and F. Xu	458
Development of On-Line Automatic Monitoring System for the Steel Belt Conveyor S.S. Zhao, B.J. Guo and X. Yang	462
Research on Cutting Performance of Graphite-Like Carbon Coated Tools in Dry Drilling of Ferrous Metal	
J.M. Xiao, Y. Li, L.J. Bai, Q.L. Yuan and J.M. Zheng Surface Wettability of Polypropylene Non-Woven Using Atmospheric Pressure N ₂ Dielectric	467
Barrier Discharge Plasma Y. Zhang, B. Zhao and J.L. Tong	472
Simulation and Experiment on the Vibration Performance of Pre-Loaded Multi-Plies Bellows	
W. Ma, Y.J. Yu, Y.G. Liu, J.S. Li and Y.J. Xue	476

New Method of Pre-Stress Hard Cutting for Screw Shaft B.Y. Ye, J.P. Liu, M.Y. Qin, C.Z. Zhang and X.Z. Zhao	481
Measuring and Monitoring System of Weighing Process for Liquid Material X.C. Ku, J.S. Li, W. Ma and H.B. Han	486
Study on the Friction Characteristics of Different Lubrication Modes under Alternating Magnetic Field H.B. Liu, J.S. Li, Y.J. Xue and W. Ma	490
Morphology and Microhardness of Nickel Electroformed under Vacuum-Degassing Conditions	
P.M. Ming, Y.J. Li and W.J. Jiang	495
Parametric Intelligent Design System of Manipulator of 4 DOF J. Li, X.J. Zou, Y.L. Chen, Q. Sun, Y. Chen and H.J. Wang	499
Dynamic Simulation of the Assembly Process of Spindle Box of Machine Tool X.M. Li, Y.F. Tong and A.F. Hui	503
Research on Spindle Induction Motor Stator Flux Observer Algorithm F. Xu, K. Zhang and Z.X. Cui	507
Modeling and Performance Analyzing of Helix Transmission Base on Modelica J.X. Chen, H.J. Wang, C.Y. Liu and X.J. Zou	511
Automatic Detection Apparatus Development of Steel Cord Conveyor Belt Y.N. Yun, H.M. Zhang and C.J. Li	516
Study on Drilling Force of Pore for Hard-to-Cut Material Y. Tang, B.Y. Ye, X.F. Hu and Q. Wu	521
Microscope Measurement of Jet-Pan Based on CCD D.X. Shao, J. Li, Z.S. Lu and G.L. Wang	525
Mathematical Model of Hot-Roll On-Line Grinding Detecting System C.H. Li, Y.L. Hou and G.Q. Cai	530
Exploration into the Innovative Mode of Combining Learning with Researching and	
Production H.J. Hong, W. Luo, Z.Y. Zhang, L.C. Zhang and D.P. Fan	535
On-Line Prediction Model of Ultrasonic Polishing Surface Roughness M. Zhang, X.Q. Yang and B. Zhao	539
Analysis on Forming Characteristics of Cup-Shaped Thin-Walled Inner Gear Spinning L.Y. Sun, B.Y. Ye, Q.X. Xia and X.Q. Cheng	544
A Study on Chip Breakage in Mini-Pore Vibration Drilling for Hard-to-Cut Material of Austenitic Stainless Steel J.S. Zhou, B.Y. Ye and X.Y. Lai	548
Intelligent Design of a Mechanical Part Library in Real-Time Collaborative Design C.Z. Zhang, B.Y. Ye and L. Liu	553
Fault Diagnosis of Rotating Machinery Base on Wavelet Packet Energy Moment and HMM C.L. Zhang, X. Yue, S. Li and J. Li	558
Profile Error Synthetic Prediction Model for One-Side Milling of Spatial Cams Z.H. Hu, X. Yi and J.L. Yuan	565
Research on Grinding Technology of Isometric Polygonal Profile D.S. Wang, A.P. Zhou and J.L. Tong	571
Research on the Unstability Motion of BTA Deep Hole Boring Bar W. Zhao, D. Huang and Z.Q. Hu	575
Influence of Original Structure on the Grind-Hardened Layer Structure and its Property of 65Mn Steel	
L.F. Liu, J.Z. Zhuang, S.W. Huang and Z.L. Xu	580
Research on Dynamics Parameter Identification of Limb for Rehabilitation Robot X.B. Guo and Y. Zhai	585
An Operation Model of Fault Diagnosis Based on Grid G.R. Chen, P. Yan and J. Zhao	590
The Study on Application of Worm's Numerical Control Machining Y.L. Yu and Z.D. Geng	594
Real-Time B-Spline Interpolator with Look-Ahead Scheme for High-Speed CNC Machine	
Tools Y.Q. Jin, Y.H. Wang and J.G. Yang	599

An Online Modeling Method for Real-Time Thermal Error Compensation on High-Speed Machines Based on RBF Neural Network Theory H.T. Zhang, H. Jiang and J.G. Yang	606
Research on Applying Image Processing Technology to Determine Center of Parts Y.Y. Zheng, J.L. Rao and L. Wu	612
Application of a Bayesian Network to Thermal Error Modeling and Analysis for Machine Tool	
X. Li, Q. Lei and Z.H. Li	616
Application of Ubiquitous Sensor Network in Collection and Analysis of CNC Machine Tool Processing Status Information X. Li and Y.Y. Yu	621
Research and Development of Ultrasonic Vibration Internal Grinding Technology H. Li, Z.W. Zhang and Z. Yin	625
Current Development and Countermeasure of Ultra-Precision Machine Tools R.J. Song, J.L. Niu and D.H. Chen	632
The Machined Surface Residual Stress of Nano-Ceramics with Two-Dimensional Ultrasonic Vibration Assisted Grinding	637
X.Q. Zhang, C.Y. Zhao and B.Y. Du A Strapdown Measurement of Vehicle Posture L.M. Wu, L.K. Zhang, Y.F. Li and X. Xiao	643
Influence Research on Passivation to Abrasion Behaviour of Coated Milling Cutter Edge of	0.13
Wheel E.G. Zhang and Y. Wu	648
Study on Model of Ultrasonic Polishing Machining - Pulse Electro- Chemical Machining Compound Finishing for the Hard and Brittle Metals C.G. Zhang, Y.Z. Hu and B. Zhao	653
Research on Elliptic Vibration Dressing of Large-Grit Bronze-Bonded Diamond Grinding Wheel	650
G.F. Gao, B. Zhao and J.L. Tong	658
Ontology-Based Knowledge Modeling for Collaborative Product Development K. Lv, Q.L. Zeng and Y.F. Li	662
Theoretical and Experimental Study on the Structure and Vibration Isolation Characteristics of a Hydraulic Engine Mount	
Q. Li, B. Zhao and J.C. Zhao	667
Elastic Waves in Piezoelectric Spherical Curved Plates J.G. Yu and X.F. Dong	672
Synchronous Control Research Based on Hybrid Network F.P. Lu, J.Z. Wu and J.L. Liu	678
Study on the Edge Quality Control in Grinding Engineering Ceramics P.Y. Bian, B. Zhao and Y. Li	682
Study on the Plastic Removal Mechanism of Nano-ZrO₂ Ceramics by Ultrasonic Grinding J.X. Xue, B. Zhao and G.F. Gao	686
Error Calibration Technique of Laser Tracker and its Application Y.G. Yan, Z.K. Wang, X.B. Wang and Y.Q. Li	690
Stiffness Analysis for Large-Travel Rotational Butterfly Pivot Y.F. Lu, Q.K. Zhou, D.J. Sheng, D.P. Fan and Z.Y. Zhang	694