Advances in Materials Manufacturing Science and Technology II

Selected Papers from the 12th International Manufacturing Conference in China
September 21-23, 2006, Xi’an, China

Edited by
Chengyu Jiang, Geng Liu, Dinghua Zhang and Xipeng Xu
# Table of Contents

## Preface vii

**A Study on Driving Interference-Fit Fastener Using Stress Wave**  
Z.Q. Cao and Q.H. Qin .......................................................... 1

**Manufacturing of a NbC Particulate Reinforced P/M Iron-Base Valve-Guide Cup**  
Z.Y. Xiao, T.L. Ngai, M. Shao and Y.Y. Li .................................. 5

**Study of Interfacial Bonding Strength of Coat Based on XRD**  
D.J. Kong, Y.K. Zhang, A.X. Feng, J.Z. Lu and T. Ge .................... 9

**Precision Forging of Casting AZ31 Magnesium Inner Spur-Gear**  
H.B. Li, M. Huang, J.T. Luo and J. Zhao .................................. 13

**Study on Residual Stress of 3A21 Metal Sheet by Laser Shock in Oblique Angle**  
Y.K. Zhang, L.H. Zhang, D.J. Kong, T. Ge and X.D. Ren .................. 17

**Experimental Study of Micro Holes Machining by USM**  
B.X. Jia, W.S. Zhao, F. Sun and Z.L. Wang ................................ 21

**Hot Press Sintering and Superplastic Forming of Fine-Grained Si₃N₄-Si₂N₅O Composites**  
Q. Zhang, J.T. Luo and K.F. Zhang .......................................... 25

**Experimental Study of Micro-Flowing Characteristics of Liquid Transport in Round Micro-Channels**  

**Development of a Fast Tool Servo for Ultraprecision Turning**  
Y.L. Tian, D.W. Zhang and H.H. Ruan ....................................... 33

**Microstructure and Mechanical Properties of Nano-Scale Al₂O₃ Toughened Ti (C,N) Matrix Cermet Tool Materials**  
C.Z. Huang, J. Wang, L.Q. Xu, S.L. Wang and H.L. Liu ................... 37

**Effects of Additives and CBN Grit Size on the Machinability of PCBN Tools**  
Z. Lv, J.F. Feng, F. Lin and X.P. Xu ....................................... 41

**Influence of Cutter's Helix Angle, Workpiece Hardness, Milling Orientation, and MQL in High-Speed Side Milling of AISI D2**  
A. Iqbal, N. He, L. Li and Y. Xia ........................................... 45

**Synthesis Error Modeling and Thermal Error Compensation of Five-Axis Machining Center**  
X.S. Wang, J.G. Yang and Q.J. Guo .......................................... 49

**Research on the Inverse Dynamics of the Flexible Multi-Body Systems for the Hybrid Polishing Kinematics Machine Tool**  
M. Yu and J. Zhao .............................................................. 53

**Diamond Turning of Special Stainless Steel by Applying Ultrasonic Vibration with Gas Shield**  
Y.L. Zhang, Z.M. Zhou and Z.H. Xia ........................................ 57

**Study on Surface Topography and Tribological Characteristics Finished by Abrasive Jet with Grinding Wheel as Restraint**  
C.H. Li, G.Q. Cai and S.C. Xiu .............................................. 61

**Research on the Microfluidics Control Method Based on the EOF Technology**  
H.Y. Jiang, H.K. Yang, Y. Wang and T. Jiang ............................. 65

**A Research on Manufacture Technology of Superhard Material Precision Reamers Based on Inside-Holding Technique**  
M. Chen, W. Huang and C.H. Wang .......................................... 69

**Study of the Effect of Coatings on Mechanical Properties of TC4 Titanium Alloy during Laser Shock Processing**  
X.D. Ren, Y.K. Zhang, J.Z. Zhou, A.X. Feng and D.J. Kong ............... 73
Dynamic Monitoring and Intelligent Dressing of Diamond Wheel for Precision Curve Grinding  

Experimental Investigation on Friction Performance of Mechanical Seals with a Laser-Textured Seal Face  

Analysis on Mechanics Property of PCD Tool While Machining Ceramics  
Overlay of HPL Flooring  
Q.S. Bai, Y.C. Liang, Y.X. Yao and P. Bex ........................................................................ 85

Study on the Dynamic Active Confocal Probe Based on Time Difference for Surface Measurement  
H.W. Zhang, G.X. Zhang, Y.M. Fan, J. Qin, Z. Li and X. Gao ............................................. 89

Investigation on the Mechanisms of Flexible Sheet Metal Forming Using Plasma Arc  
M.L. Wang, L.J. Yang and Y. Wang .................................................................................. 93

A Precision Tension Control System Based on PIC  
S.L. Ren, Y.Z. Wang, H. Lu and G.S. Su ........................................................................ 97

Study on Characteristics and Principium of Rare Earth Carbide Tools  
T. Fu, Q.X. Yu and S.Q. Pang .......................................................................................... 101

An Intelligent Cutting Database for Die and Mold Making Operations  
Z.Q. Liu, K.J. Xiang and X.G. Peng ................................................................................. 105

Study on Ultra-Precision Ball Surface Floating Polishing Kinematics Mechanism  
X. Li, J.L. Yuan, D.H. Wen, Q.F. Deng and F.Y. Lou ........................................................ 109

A Novel Edge Detector for the Pressed Characters Based on the Facet Model and the Topographic Structures  
X.Y. Li, C.H. Lu and J.M. Li .............................................................................................. 113

Effect of Filler Shape and Volume Fraction on Strain Damage of Particulate-Reinforced Dental Composites  
Y.P. Chan, C.Y. Tang, B.W. Darvell and C.P. Tsui .......................................................... 117

Study on the Synthesis Mechanism of Nanocrystalline Diamond Thick Films  

Constitutive Equation for 7050 Aluminum Alloy at High Temperatures  
X.L. Fu, X. Ai, S. Zhang and Y. Wan ............................................................................... 125

The Validation of the Feasibility of Abnormal Form Patch Winding  
X.F. Wang, H.Y. Fu and Z.Y. Han .................................................................................... 129

Research on Material Removal Mechanism of Magnetorheological Finishing  
G.W. Kang and F.H. Zhang ............................................................................................. 133

The Fracture Microphology of the Ceramics by Strong Laser Shock Processing  
L.F. Zhang, Y.K. Zhang and A.X. Feng ........................................................................... 137

Determining and Optimizing of Guide Rolls Motion Track in Cold Ring Rolling Process  
Z.C. Sun, H. Yang and L.Y. Li .......................................................................................... 141

A Novel Superfine Machining Technology Based on the Magnetorheological Effect of Abrasive Slurry  

Research on Variation of Stress and Strain Field and Wall Thickness during Cone Spinning  
M. Zhan, H. Yang, J.H. Zhang, Y.L. Xu and F. Ma ............................................................ 149

Research of Mechanism of Chipping in Step Tapping of Superalloy Based on Wavelet Analysis  
F.Q. Han, G.J. Li, X.S. Pang, Z.Z. Li and D.Y. Zhang ....................................................... 153

Wear Characteristics of ID Saw Blade in Silicon Ingot Slicing Process  
X. Wei, H. Yuan, R.W. Huang and S.H. Lai ..................................................................... 157
An Analytical Model for Electrically Actuated Scanning Probe in Electrostatic Force Microscopy
H.X. Wang, J. Zhao and J.Y. Jia .................................................. 161

Study Morphology Transitions in Self-Assembled Triblock Copolymer Thin Films with Nanostructures by AFM
Y.Z. Cao, S. Dong, Y.C. Liang and T. Sun ................................ 165

Ultra-Precision Cutting of Brittle Materials with Ultrasonic Vibrated Diamond Tool
C.X. Ma, E. Shamoto, L.M. Xu, N. Liu and T. Moriwaki .................. 169

Experimental Research on Machining Performance of Electrode Materials in Dry EDM
L.Q. Li, Z.L. Wang, Y.F. Guo and J.C. Bai .................................. 173

Analysis of Disassembled Module with Damage Model for Recycling
Y. Ji, H. Narita, L.Y. Chen and H. Fujimoto ............................... 177

MEMS R&D Trends
C.Y. Jiang, Y. He and W.Z. Yuan ................................................. 181

Research on Mechanism of Electrochemical Mechanical Finishing
X. Adayi, J.J. Zhou, G.B. Pang and W.J. Xu ......................... 185

Arc Envelope Grinding of Non-Axisymmetric Aspheric Surface Using Equal-Envelope Height
J. Xie and W.W. Xu ................................................................. 189

Research on the Plunge Milling Techniques for Open Blisks

The Study of Tool Wear and Breakage Based on the Characteristic Analysis of Acoustic Spectrum
Q.C. Dong, C.S. Ai and N. Wang .................................................. 197

Fabrication and Characterization of HA/CNT Bioceramics
Y.H. Meng, C.Y. Tang and C.P. Tsui ........................................ 201

Research on Stress and Strain Distribution during Multi-Pass Conventional Spinning under Different Roller Motion Modes
J.H. Liu and H. Yang ............................................................... 205

Research on Influence of the Material Anisotropy to the Surface Quality during SPDT Machining of Crystal KDP
M.J. Chen, Y.C. Liang, J.H. Wang and X.Z. Zhang ......................... 209

Analysis of Chip Breaking Prediction in Cutting Aluminum Alloys
E.L. Liu, R.D. Han, G.Y. Tan and Z.J. Li ....................................... 213

Research on Thermal Spray Al-Al2O3/TiO2 Coating and Diffusion Treatment on Magnesium Alloy
H. Ye, Z.L. Yan, Z.F. Sun and Y. Wang ........................................ 217

Fabrication of Microelectrode by Current Density Control in Electrochemical Micromachining
B.G. Zhu and Z.L. Wang ............................................................. 221

Study on Technology of Micro-EDM with Lower Working Voltage
W.L. Zeng, Z.L. Wang, Q. Gao, W.Z. Li and W.S. Zhao ...................... 225

Research on a Novel Testing Way for Collective Short Cracks by Industrial CT
X.G. Xu, D.H. Zhang, X.B. Zhao and B. Ao ..................................... 229

Modeling of Back Pressure Distribution on the Wafer Loaded in a Multi-Zone Carrier in Chemical Mechanical Polishing
Y.H. Sun, R.K. Kang and D.M. Guo ............................................. 233

Study on Process of Planing Forming of Plate Fin Heat Sinks
Z.P. Wan, Y. Tang, W.J. Deng and Y.J. Liu ..................................... 237

Study on Surface Integrity of an Ultra-High Strength Alloy in HSC Process
<table>
<thead>
<tr>
<th>Title</th>
<th>Authors</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study on the Multi-Phase and Multi-Scale Nanocomposite Ceramic Tool Material</td>
<td>H.L. Liu, C.Z. Huang, J. Wang and X.Y. Teng</td>
<td>245</td>
</tr>
<tr>
<td>Deposition and Characterization of Ultra-Smooth Nanocrystalline Diamond Films Using a Graphite-Grid Assisted Hot Filament CVD Method</td>
<td>F.H. Sun, Z.M. Zhang, H.S. Shen and M. Chen</td>
<td>249</td>
</tr>
<tr>
<td>Research on EDC Special Pulse Generator and Its Experiments</td>
<td>Z.L. Wang, Y. Fang and W.S. Zhao</td>
<td>253</td>
</tr>
<tr>
<td>Study on Effects of the Feed on AFM-Based Nanomachining Process</td>
<td>Y.D. Yan, T. Sun and S. Dong</td>
<td>257</td>
</tr>
<tr>
<td>A Reappraisal of Various Compacting Processes for Wasted Expandable Polystyrene (EPS) Foam</td>
<td>J.M. Seo and B.B. Hwang</td>
<td>261</td>
</tr>
<tr>
<td>Study on Scanner for Large-Diameter Tubular Joint Welds Based on Ultrasonic Phased Array</td>
<td>Z.Q. Deng, G.P. Hao, D.W. Tang and B.H. Shan</td>
<td>265</td>
</tr>
<tr>
<td>Performances of HSK Spindle/Toolholder Interface for HSM</td>
<td>S. Zhang, X. Ai, J.F. Li and X.L. Fu</td>
<td>269</td>
</tr>
<tr>
<td>Study on Finishing Cut with Dry WEDM</td>
<td>T. Wang, X.F. Zhang and X.F. Zhao</td>
<td>273</td>
</tr>
<tr>
<td>Research on the Curvature Radius of Roller-Trace in the Forming Process of Conventional Spinning</td>
<td>F. Ma, H. Yang and M. Zhan</td>
<td>277</td>
</tr>
<tr>
<td>Comparison of Bending Strength for Metal-Diamond Composites of Two Bond Matrices</td>
<td>Y.Q. Yu, X.R. Tie and X.P. Xu</td>
<td>285</td>
</tr>
<tr>
<td>Research on Grinding Temperature of WC-Co Coating by Cup Wheel</td>
<td>Q. Wu, Y.M. Luo, D.J. Hu and H.J. Xu</td>
<td>289</td>
</tr>
<tr>
<td>Prediction of Surface Quality for Silicon Carbide Wheel Grinding of Silicon Nitride</td>
<td>L.M. Xu, A.J. Shih, B. Shen, C.X. Ma and D.J. Hu</td>
<td>297</td>
</tr>
<tr>
<td>The Influence of Acoustic Cavitation to Microscopic Material Removal in Polishing Process Based on Vibration of Liquid: A Numerical Study</td>
<td>Z.N. Guo, Z.G. Huang and X. Chen</td>
<td>301</td>
</tr>
<tr>
<td>Fabrication of Micro Structure Using EDM Deposition</td>
<td>B.D. Jin, W.S. Zhao, G.H. Cao, Z.L. Wang and K. Xiao</td>
<td>305</td>
</tr>
<tr>
<td>Research on the Modeling Algorithm for the Camber of Large-Sized Revolving Parts</td>
<td>Z. Ruan, D.J. Hu, L. Shi, H.L. Wang and M.S. Liu</td>
<td>309</td>
</tr>
<tr>
<td>Dry-Cutting Concrete Study of Diamond Saw Blade with Different Segment Width</td>
<td>S.S. Hu, C.Y. Wang, B.D. Chen and Y.N. Hu</td>
<td>321</td>
</tr>
<tr>
<td>Study on the Method for the Optimization of Cutting Parameters</td>
<td>J.Y. Zhang, S.Q. Pang and Q.X. Yu</td>
<td>325</td>
</tr>
<tr>
<td>Title</td>
<td>Authors</td>
<td>Page</td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
<td>-----------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>Surface Roughness Characteristics of Finely Ground Ceramics</td>
<td>J.Y. Shen, W. Lin, H. Ohmori and X.P. Xu</td>
<td>416</td>
</tr>
<tr>
<td>Nano Ferrofluidic Scale the String Axle of Big Length to Radius</td>
<td>Y.N. Rui and M.D. Wang</td>
<td>420</td>
</tr>
<tr>
<td>Optimizing TiN Coating Surface Roughness with RSM</td>
<td>S.L. Yim, K.M. Yu, L.C. Chan, D. Kwok and T.C. Lee</td>
<td>424</td>
</tr>
<tr>
<td>Experimental Researches on Rapid Forming Full Compacted Metal Parts by Selective Laser Melting</td>
<td>Q.L. Deng, A.N. Xie, Z.J. Ge and J.L. Song</td>
<td>428</td>
</tr>
<tr>
<td>FEM Analysis of Grinding Damage Mechanisms for Ceramics Materials</td>
<td>W.N. Hao, Y.M. Bao and G.Z. Chai</td>
<td>432</td>
</tr>
<tr>
<td>Study on the Wear of Diamond Beads in Wire Sawing</td>
<td>H. Huang and X.P. Xu</td>
<td>436</td>
</tr>
<tr>
<td>Prediction and Design of the Optimal Punch Shape for Recess Forging</td>
<td>C.Y. Wu, Y.C. Hsu and T.S. Yang</td>
<td>440</td>
</tr>
<tr>
<td>Experiment Study on Machinability of Six Kinds of Wrought Nickel-Based Superalloys</td>
<td>G. Liu and M. Chen</td>
<td>444</td>
</tr>
<tr>
<td>Analyze and Correct Model for Machining Involute Spline</td>
<td>F.K. Cui, Y. Li, Y.W. Zhou and F.S. Zhang</td>
<td>448</td>
</tr>
<tr>
<td>Application of an Intelligent Force Controller for Robotic Deburring Process</td>
<td>X.L. Wang, Y. Wang and Y.N. Xue</td>
<td>456</td>
</tr>
<tr>
<td>Study on Fixed Abrasive Lapping Technology for Ceramic Balls</td>
<td>B.H. Lv, J.L. Yuan, Y.X. Yao and Z.W. Wang</td>
<td>460</td>
</tr>
<tr>
<td>Fabrication of Ultra-Fine Abrasive Polishing Pads by Gel Technique</td>
<td>J. Liu, Y.Q. Yu and X.P. Xu</td>
<td>468</td>
</tr>
<tr>
<td>Finite Element Analysis of the Electromagnetic Field of Untouched Permanent Induction Magnetic Coupling</td>
<td>C.J. Yang, Y.N. Wang and S.F. Jiang</td>
<td>476</td>
</tr>
<tr>
<td>On Study of Cutting Forces Generated by Minor Cutting Edges</td>
<td>W.H. Zhao, S.C. Xiong, D.H. Wen, X. Lv and J.L. Yuan</td>
<td>484</td>
</tr>
<tr>
<td>Manufacturing Technique of High Precision Intricate Diamond Dressing Roller</td>
<td>Z.M. Cui, Z.R. Liu and H.Y. Zhang</td>
<td>492</td>
</tr>
</tbody>
</table>
A Practical Approach to Generating Accurate NURBS Tool Paths for CNC Machining of Sculptured Surface Parts
Z.Z.C. Chen and X.J. Yang .......................................................... 500

Application of Atmospheric Pressure Plasma in the Ultrasmooth Polishing of SiC Optics
B. Wang, Q.L. Zhao, L.P. Wang and S. Dong .................................. 504

Technology and Study on Circular Arc Flexible Forming of Sheet Metal Using Plasma Arc
W.B. Wu, W.J. Xu, Z.Y. Wang and J.J. Zhou .................................. 508

Evolution Trends of Material Usage and Processing in Spectacle Frame
M.L. Fung, K.M. Yu and M.W. Yuen ............................................. 512

An XML-Based Middleware for Information Integration of Enterprise Heterogeneous Systems
S. Li, D.H. Zhang, J.T. Zhou, G.H. Ma and H. Yang .......................... 516

Variable Radius Conformal Cooling Channel for Rapid Tool
K.M. Au and K.M. Yu ................................................................. 520

Fabrication of Patterned Metal Films on Organic Substrates by Transfer Printing

Study on Pre-Stress Cutting of Bearing Race and Its Machined Surface State
B.Y. Ye, B. Wu, J.P. Liu, X.C. Liu and X.Z. Zhao ............................ 528

Study on Material Removal Mechanism of Fine-Crystalline ZrO₂ Ceramics under Two Dimensional Ultrasonic Grinding
Y.Y. Yan, B. Zhao, Y. Wu, C.S. Liu and X.S. Zhu ............................. 532

Effect of Rounded Cutting Edge Radius on Residual Stress within Machined Sublayer
W.J. Deng, Y. Tang, W. Xia and Z.P. Wan ..................................... 536

Study on Surface Integrity in Hard Milling of Hardened Die Steel
L.L. Jing, G. Liu and M. Chen ...................................................... 540

Defect Free Machining of Glass with Improved Surface Characteristics
S. Takahiro and W. Ryo .............................................................. 544

Metal Machinability Evaluation with DEA Method
Y. Chen, A.B. Yu, D.W. Jia and N. Zhao ...................................... 548

Development of a Control System on 5-Axes Automatic Scanning for Nondestructive Ultrasonic Test
J. Wei, J. Xiao and H.W. Ma ....................................................... 552

Subvoxel Level Short Crack Simulation and Visualization
B. Ao, D.H. Zhang, X.B. Zhao and X.G. Xu .................................. 556

The Study of Collateral Damages in the Process of Femtosecond Laser Micromachining Single-Crystalline Silicon

Microstructure and Mechanical Property of Electron Beam Brazing and Vacuum Brazing Joints of Stainless Steel
J.M. Li, F.R. Chen, J. Liu, R.J. Xie and G. Hu .................................. 564

Fabrication of Three-Dimensional Micro-Structures with Two-Photon Absorption by Femtosecond Laser
M. Zhou, H.F. Yang, L.P. Liu and L. Cai ....................................... 568

Ultrafast Relaxation Character of Nonequilibrium Carriers in GaAs Excited by Femtosecond Laser
M. Zhou, D.Q. Yuan, L.P. Liu, H.X. Liu and N.F. Ren ...................... 572

Study on Connotation and Architecture of the Ecological Economic Booster Explosive Green Manufacturing Process
G.C. Ma, S.S. Zhang and J.L. Zhang ........................................... 576
<table>
<thead>
<tr>
<th>Title</th>
<th>Authors</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formation and Control of Feed Direction Burrs in Machining</td>
<td>G.C. Wang, C.Y. Zhang, H.J. Pei, Y.M. Zhu and L.J. Ma</td>
<td>580</td>
</tr>
<tr>
<td>Research of Surface Hardening Based on Transverse Feed Grinding</td>
<td>J.D. Liu, G.C. Wang, Q.F. Li, H.J. Pei, Z.H. Jia and Z. Wang</td>
<td>584</td>
</tr>
<tr>
<td>Experimental Study on the Growth Behaviors of Oxide Layers in ELID</td>
<td></td>
<td>588</td>
</tr>
<tr>
<td>The Centerline Position Measuring and Online Machining Compensation</td>
<td>L. Zhang, B. Zhang, L. Ba and H. Gao</td>
<td>592</td>
</tr>
<tr>
<td>A Study on Ti&lt;sub&gt;3&lt;/sub&gt;SiC&lt;sub&gt;2&lt;/sub&gt; Reinforced Copper Matrix Composite by Warm</td>
<td></td>
<td>596</td>
</tr>
<tr>
<td>Study on the Intelligent Control of Springback in Stretch Bending Process Based on Neural Networks</td>
<td>Y.J. Wang, J.B. Wang, S.M. Wei and J.J. Jiang</td>
<td>604</td>
</tr>
<tr>
<td>A CAI System for GNC Precision Complex Product</td>
<td>L. Feng and Q.H. Le</td>
<td>608</td>
</tr>
<tr>
<td>Research on the Chatter Suppression During Machining Thin-Walled Complex Blades</td>
<td>J.X. Ren, D.H. Zhang, Y.Y. Shi and Z.Q. Wang</td>
<td>616</td>
</tr>
<tr>
<td>Studies on the Solid Conveying Process in Micro Injection Molding Machine</td>
<td>Y. Xu, K.L. Yung, H.P. Ng</td>
<td>620</td>
</tr>
<tr>
<td>Effects of Surface Conditions on Rheological Properties and Phase Orientation of Sheared LCP Melts in Nanochannels by MD Studies</td>
<td>L. He, K.L. Yung, Y.W. Shen and Y. Xu</td>
<td>624</td>
</tr>
<tr>
<td>Study on the Approach of Deformation Path Control Using Numerical Simulation and Neural Network</td>
<td>J.J. Wu</td>
<td>632</td>
</tr>
<tr>
<td>Study on Formalizable Aircraft Assembly Process Planning Knowledge</td>
<td>H.J. Qiu, H. Tao, B.T. Yang and X.B. Gao</td>
<td>640</td>
</tr>
<tr>
<td>Tool Wear and Surface Integrity in High Speed Milling of a Near Alpha Titanium Alloy</td>
<td>Y.P. Zhang, J.H. Xu and G.S. Geng</td>
<td>644</td>
</tr>
<tr>
<td>Diode Laser Modification of Surface Gradient Layer Properties of a Hot-Work Tool Steel</td>
<td>L.A. Dobrzanski, M. Bonek, M. Piec and E. Jonda</td>
<td>657</td>
</tr>
</tbody>
</table>
High-Quality NC-Data Generation in Mold and Die Manufacturing
D.W. Kim, E.Y. Heo, B.H. Kim and I.H. Yang .................................................. 661

A Novel Fabrication Method for Mold Insert of Injection Molded Microlens Array
Y.K. Shen .............................................................................................................. 665

The Solving Methods of Dwell Time or Pressure in CCOS for Optical Complex Surfaces
H. Cheng, S. To and Y. Wang .............................................................................. 669

Study on the Tool Path Generation of an Automotive Headlamp Reflector in
Ultra-Precision Raster Milling
S. To, H. Wang, B. Li, C.F. Cheung and S.J. Wang ........................................... 673

Synthesis and Analysis of 4-DOF Parallel Manipulator with Passive Subchain
Y. Hu, B. Li, H. Hu and Y. Wang ........................................................................ 677

Temperature and Humidity Effects on Micro/Nano Handling
Q. Zhou, B. Chang and H.N. Koivo .................................................................. 681

Convenient Method to Fabricating Complicated Microstructures on Thermoplastics
B.K. Jin, K.L. Yung, Y. Xu and C.Y. Chan ......................................................... 685

An Investigation of Form Compensation in Fabricating Microlens Arrays
by Ultra-Precision Fast-Tool-Servo Technology
T.C. Kwok, S. To, C.F. Cheung, S.J. Wang and W.B. Lee .............................. 689

A Study of a Digital Manufacturing Procedure for Freeform Optics
S. To, E.Q. Wang, W.B. Lee and C.F. Cheung .................................................. 693

The Effect of Up-Cutting and Down-Cutting Directions on Materials Swelling
in Ultra-Precision Raster Milling
M.C. Kong, W.B. Lee, C.F. Cheung and S. To .................................................. 697

Numerical Simulation on Thixoforming of Wrought Magnesium Alloy
H. Yan, C. Xu and G.X. Chen ............................................................................. 701

Topological Design of Three-Dimensional Microstructure Based on
Homogenization Effective Method

Determination of the Interface Heat Transfer for the Investment Castings of Aerofoil-Shaped
Turbine Blades Using Optimization and FE Method
D. Zhang and W.H. Zhang .............................................................................. 709

Efficient Algorithms for Calibration of Cutting Force Coefficients in Flat End Milling
M. Wan, W.H. Zhang, G. Tan and G.H. Qin ..................................................... 713

The Calculation of Two-Phase Gas/Liquid Homogenous Flow in Bearing Chambers
H.T. Wu and G.D. Chen .................................................................................... 717

Thermal Elasto-Plastic Asperity Contacts of Layered Media
R.T. Tong, G. Liu, Q.R. Zeng and T.X. Liu ....................................................... 721

Using Gray Forecasting Estimates Cost of Aviation Project
M. Yang, Y. Li and Y.C. Wang .......................................................................... 725

Cutter Optimal Selection of CAPP System Facing to the Modern Manufacture
L. Li, E.F. Liu and Q.S. Jin ............................................................................... 729

3D Rigid-Viscoplastic FEM Simulation of Forging Process of a Gas
Turbine Rotor Blade

Development of 3D Parameterized Design System for Turbine Compressor Impellers
H. Gao, J.P. Yu and X.S. Liu ............................................................................ 737

Maximum Shear Stress Analyses of the Cermet Cladding Part under Wear Condition
J.R. Yang, Y.K. Zhang, Z.Q. Li and C.Z. Huang ................................................ 741

Fabrication of Fiber-Reinforced CPC Composite Artificial Bone by RP/RT
Q. Lian, D.C. Li and B.H. Lu ............................................................................ 745
Modeling of Mold Filling Process of Al Casting and Validation with X-Ray In-Situ Observation  
H.D. Zhao and I. Ohnaka .................................................................................................................. 841

Cutting Force Experiment and Simulation by Hard Turning GCr15 Bearing Steel with High 
Speed Considering Cutting Edge Preparation  
Y. Wang, F.G. Yan, J.S. Hu, T. Chen, Z. Chang and X.L. Liu ......................................................... 845

The Research on the Orientation Error of Three-Axis Turntable in Theory and Measuring 
Method Based on Assembling  
Y. Li and D.P. Fan .......................................................................................................................... 849

Study on the New Tooth Profile of Silent Chain  
Y.N. Xue, Y. Wang and X.L. Wang .................................................................................................. 853

Study on the Technology of Bridge Crane Design and Explore with Green Quality Function 
Deployment  
H. Zhang, X.Z. Wu and Z.G. Jiang ............................................................................................... 857

Application of Abductive Network and FEM to Predict the Maximum Forging Force and the 
Final Face Width of Spur Gear  
T.S. Yang and Y.C. Hsu ................................................................................................................. 861

The Prediction of Earing and the Design of Initial Shape of Blank in Cylindrical Cup Drawing 
T.S. Yang and Y.C. Hsu .................................................................................................................. 865

The Study of Five-Axis NC Simulation by Stencil Buffer Algorithm  
Y.H. Wang, L.Q. Zhang and M. Chen ............................................................................................... 869

An Optimal Feed Interpolation Algorithm for High-Speed Five-Axis Machining  
Y.H. Wang, J.C. Feng, Y.H. Li and M. Chen .................................................................................. 873

A Virtual Cutting Based Method for Aero Engine Turbine Blade Reverse Modeling from Its 
Cone Beam CT Images  
Y.Y. Cheng, K. Pu, Y.P. Liu and X.B. Zhao .................................................................................. 877

Elastic-Plastic Contact Analysis of Materials with Gradient Yield Strength  
Q. Xie, G. Liu, T.X. Liu and J.Q. Wang .......................................................................................... 881

Study on Non-Interference Normal Tracking Algorithm for NC Quick-Point Grinding of the 
Curve Parts  
Y.M. Luo, Q. Wu and D.J. Hu ......................................................................................................... 885

A New Method for Solving the Direct Kinematics of 6-DOF SPS  
Q. Li and H.B. Yan ........................................................................................................................ 889

Contact Analysis and Optimization of Elastic Orientating Component by Finite Element 
Method  
D.L. Liu, F.L. Ma and G.P. Wang ................................................................................................. 893

Research on GA-ANN Integration and Its Applications to Cold Extrusion Process Design  
T.W. Ji, J. Gao, G.Q. Zhao and C.R. Zhang ................................................................................ 897

TRIZ-Aided Innovation in Conceptual Design of Control Strategies  
G.Q. Liu and W.G. Liu .................................................................................................................. 901

Real-Time Model Building and Experiment Researching of Grinding Force for External Plunge 
Grinding Process  
G.F. Li, L.S. Wang and S.X. Yang ................................................................................................. 905

Research on Integration Technology of Numerical Engineering Collaborative Design and 
Simulation Platform  
H.W. Wang, G. Liu and L.Y. Wu ................................................................................................. 909

Case-Based Assembly Coordination Process Planning for Aircraft  
K.F. Zhang, Y. Li, X. Qiu and H.C. Yang .................................................................................. 913

Research on an Information Integration Framework on the Large Complex Product 
Development PMIS with ERP  
S.Z. Zhao and M. Yin ................................................................................................................ 917

Experiment Study on Shape Defect of Cylinder Shallow Shell  
Y.Y. Yang, L.H. Zhao and Z.Z. Sun .......................................................................................... 921
<table>
<thead>
<tr>
<th>Title</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Numerical Simulation of Orthogonal Cutting Process of a Kind of Difficult-to-Cut Material</td>
<td>925</td>
</tr>
<tr>
<td>Research on XML-Based Database Integration for Collaborative Design and Manufacture of Space Antenna</td>
<td>929</td>
</tr>
<tr>
<td>Manufacturing-Oriented Multi-State Model for Aircraft Sheet Metal Parts</td>
<td>933</td>
</tr>
<tr>
<td>Prediction of Shot Peen Forming Parameters of Integral Aircraft Wing Panels</td>
<td>937</td>
</tr>
<tr>
<td>Firm Discrimination Pricing Strategies with Network Effect</td>
<td>941</td>
</tr>
<tr>
<td>A Study on Titanium Alloys Deep-Hole Drilling Technique</td>
<td>945</td>
</tr>
<tr>
<td>Applying Hierarchical Clustering to Discover the Typical Process Route</td>
<td>949</td>
</tr>
<tr>
<td>Numerical Simulation of Heat and Mass Transfer of the Infiltration in Liquid Infiltration Extrusion Process</td>
<td>953</td>
</tr>
<tr>
<td>Numerical Simulation of Temperature Field and Grain Structure in the Solidification of K4169 Superalloy Shell Casting</td>
<td>957</td>
</tr>
<tr>
<td>A New Adaptive-Surface Elastic-Plastic Contact Model of Rough Surfaces: Parameter Correlations</td>
<td>961</td>
</tr>
<tr>
<td>Design of Forming Sheet Electrodes in Electrochemical Finishing of ZDC2 Castings Surface</td>
<td>965</td>
</tr>
<tr>
<td>Investigations on Edge Chipping in Rotary Ultrasonic Machining Using Finite Element Analysis</td>
<td>969</td>
</tr>
<tr>
<td>Study of the Strain Rate Effect on Cold-Reduced Carbon Steel and Aluminium Alloy with Numerical Simulations</td>
<td>973</td>
</tr>
<tr>
<td>Effects of Stress Relieving on Limit Dome Height of Titanium Tailor-Welded Blanks at Elevated Temperatures</td>
<td>977</td>
</tr>
<tr>
<td>Forming Simulation of Ti-TWBs at Different Elevated Temperatures</td>
<td>981</td>
</tr>
<tr>
<td>Decision Model in Selecting Engineering Materials for Pump Manufacture</td>
<td>985</td>
</tr>
<tr>
<td>Surface Characterization in Diamond Turning of Highly Anisotropy Brittle Crystals: A Multi-Spectrum Analysis Approach</td>
<td>989</td>
</tr>
<tr>
<td>Mechanical Event Simulation of Drop Testing for Toy Product</td>
<td>993</td>
</tr>
<tr>
<td>A Web-Based Cost Estimation System for Collaborative Development of Injection Mould</td>
<td>997</td>
</tr>
<tr>
<td>A New Algorithm to Refresh File Aggregates in Distributed Enterprises</td>
<td>1001</td>
</tr>
<tr>
<td>Real-Time Dispatch Strategy for Products Manufacture Based on Singular and Lattice Order Rough Set Theory</td>
<td>1005</td>
</tr>
<tr>
<td>The Applications of RFID Technology in Logistics Management and Constraints</td>
<td>1009</td>
</tr>
<tr>
<td>Title</td>
<td>Authors</td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
<td>-------------------------------------------------------</td>
</tr>
<tr>
<td>Green Manufacturing of Suspended Bio-Carriers</td>
<td>F. Jiang, W.P. Chen, M.R. Mai and T. Zhang</td>
</tr>
<tr>
<td>A New Method on Judgment and Choice of Supplier in Core Enterprise under Supply Chain</td>
<td>Z.L. Sheng, S.Z. Zhao and X.Z. Qi</td>
</tr>
<tr>
<td>A Model for Comparative Analysis of Inventory Costs of JIT and EOQ Purchasing in the Ready Mixed Concrete Industry</td>
<td>M. Wu and M.Z. Xu</td>
</tr>
<tr>
<td>Research and Application in Supply Chain Management Based on Correlation Analyze of Association Rules Algorithm</td>
<td>S.N. Qu, Q. Wang, K. Liu and D.J. Xu</td>
</tr>
<tr>
<td>An Integrated Method for Product Material Selection Considering Environmental Factors and a Case Study</td>
<td>H.J. Cao, F. Liu, C.B. Li and C. Liu</td>
</tr>
<tr>
<td>A New Approach to Achieve Lean Production in Workshop-Production Preparation Package</td>
<td>T. Li, R.X. Wang, L.J. Song and Z.Q. Luo</td>
</tr>
<tr>
<td>A CAS Approach for the Coordination and Optimization Problem in Supply Chains</td>
<td>H. Hu, G.Y. Zhu and J.S. Shen</td>
</tr>
<tr>
<td>Prediction of Spring Back of the Two-Axle Rotary Shaping Based on Neural Network</td>
<td>S.H. Lu and J. Wang</td>
</tr>
<tr>
<td>Research on Man-Machine Cooperation Manipulator and Information Integrated Technology in Advanced Manufacturing</td>
<td>Q.J. Guo, J.G. Yang, X.N. Qi and X.S. Wang</td>
</tr>
<tr>
<td>A Study on Multi-Colony Diploid Immune Algorithm and Its Application in Manufacture</td>
<td>S.B. Si, S.D. Sun, P.Y. Hou and J.J. Yu</td>
</tr>
<tr>
<td>A Study on the Aviation Manufacture Cell Scheduling Based on Adaptive Ant Colony Algorithm</td>
<td>J.J. Yu, S.D. Sun, S.B. Si, H.A. Yang and X.L. Wu</td>
</tr>
<tr>
<td>Reconfigurable Manufacturing Execution Systems Based on Model-Driven Architecture</td>
<td>Y.S. Chai, Q.B. Wang, Y.L. Zhou and B. Zhu</td>
</tr>
<tr>
<td>Research on the Problem of MC Assembly Line Balancing Based on Genetic Algorithm</td>
<td>S.L. Yang and W.P. Huang</td>
</tr>
<tr>
<td>A Job Shop Scheduling Heuristic Algorithm Based on Probabilistic Model of the Search Space</td>
<td>H.A. Yang, Y.P. Xu, S.D. Sun and J.J. Yu</td>
</tr>
<tr>
<td>A New Software Design Method Based on Configuration Conception</td>
<td>Y.L. Yang, R.X. Wang, X.C. Ku and W. Huang</td>
</tr>
<tr>
<td>Improving Supply Chain Traceability with the Integration of Logistics Information System and RFID Technology</td>
<td>K.L. Choy and S.W.K. Ng</td>
</tr>
</tbody>
</table>
A Manufacturing Supply Chain Business Model and Its Implementation in a Plastics Manufacturing Company
K.F. Chu and C.F. Cheung .............................................................. 1096

STEP-NC Based Integrated CAD/CAPP/CAM/CNC System
Z.Y. Li, X.T. Tian and G.D. Chen ..................................................... 1100

Application of Ant Colony Algorithm and Grey Relation Theory in Selecting Cooperative Manufacturing Partner
Y.D. Fang, W.P. He, L.H. Du, J.L. Chen, F. Zhao and G.F. Zhang .......................... 1104

A STEP-NC Programming System for Prismatic Parts

Research on Web Based Remote Monitor and Control System for Grinding Process
G.J. Liu, N. Mei and J.Z. Tan ............................................................ 1112

Knowledge Based Process Scheduling and Management for Multi-Agent Distributed Collaborative Manufacturing
Y.L. He, W.P. He, H.C. Yang, Y. Zhang and K. Zhao .................................. 1116

Studying on the Life Cycle Information Share and Discovery for Complicated Products Based on Data Mining and Data Grid Technology
X.F. Fang, L.C. Zhao and S.J. Su ...................................................... 1120

One Kind of Integrated Scheme of Regional Networked Manufacturing Systems
J. You, F. Liu, J. Wang, Y.C. Song and C. Yin ...................................... 1124

Implementation of Decision-Making Model System for Autonomous Vehicles in Virtual Environment
Y.F. Liang, H.W. He, D.T. Zheng and X. Chen ....................................... 1128

Measurement Technique of Grinding Wheel Topography Based on Binocular Stereo Vision
X.F. Zhang, H.J. Xu and Y.C. Fu ....................................................... 1132

The Key Technology Research of Synchronous Collaborative Assembly Based on B/S Framework
N. Wan, R. Mo and Z.Y. Chang ........................................................ 1136

Expert System of the Parameter Optimization in the Heavy-Duty Cutting Processing

Research on Innovative Product Design System Based on QFD and TRIZ

A New Approach to the Communication of the Distributed Collaborative System Based on COM+
C.B. Huang, K.Y. Jiang and X.P. Xu .................................................. 1148

Research on Sawing and Milling Features and NC Programming of Plastic Door and Window
F. Zhao, W. Wang, C.S. Ai and H. Zhang ............................................ 1152

Semantic Integration of Manufacturing Data Sources
M.W. Wang, S.S. Zhang, J.T. Zhou and H. Zhao .................................... 1156

Real Time Monitoring of Cutting Chatter Based on Fuzzy Hidden Markov Models
C.L. Zhang and L.P. Chen ............................................................... 1160

Monitoring Surface Roughness of Turning by Using Image Processing Technology
W.S. Lin, B.Y. Lee and H.H. Chen .................................................... 1164

MMAP: An Intelligent Object Paradigm for the Monitoring and Control of Mobile-Enterprise
X.N. Jiang and K.L. Yung ............................................................... 1168

Author Index ................................................................................. 1173

Keyword Index ............................................................................... 1181