

# Table of Contents

## Preface, Sponsors and Committees

## Chapter 1: Advanced Mechanical Engineering and Novel Devices

<b>Topology and Size Optimization for Landslide Body in NC Lathe</b> Z.S. Sai, G.F. Wang and M. Cong	3
<b>Simulation of Engine Block Drilling</b> H. Zhang, J. Song and M. Cong	8
<b>Design of Offsetting Steerable Mechanism for Rotary Steerable Drilling Tool Based on Double Eccentric Rings</b> Z.D. Yan, Y.F. Geng, Z.F. Wang and W.L. Wang	13
<b>Calibration and Optimization for Spindle-Tilting Type Five-Axis Machine Tools with Inclined Head AB Based on Compensation of Rotation Axis Direction Error</b> F. Liu, H. Lin, L.M. Zheng, F. Wang and L. Yang	19
<b>Study on Recognize for Lamb Wave Test Signals Based on Finite Element Modeling</b> Y. Liu, Y.M. Wang, C.J. Shen and F.R. Sun	25
<b>Efficiency Modeling and Experimental Verification of Minicar Transmission System</b> W.P. Wang	30
<b>Discrete Element Method for Mechanics Properties and Size Effect Analysis of Granite</b> Y. Ye and L. Kang	37
<b>The Drag Reduction Mechanism of Vibration Digging Shovel</b> W.Y. Ning, Y. Chen, Y.L. Kuang and Y.H. Zhang	41
<b>A Improved Design of Mechanical Structure of a Coin-Wrapping Machine Based on Pro/E Software</b> X.D. Jing, D. Wei and S. Kang	48
<b>Contact Finite Element Analysis of Spindle-Toolholder Joint</b> X.L. Song, L.G. Cai and Y.S. Zhao	54
<b>Design of Shear Stress Detection Device for Corn Stubble</b> D.W. Guo, X.W. Bai and Y.K. Li	59
<b>Study on Structural Performance of the Cylindrical Pressure Hull for Underwater Vehicles</b> Z.Y. Mao, C. Wei, Y. Fan and W.C. Huang	64
<b>Failure Modes Mechanisms Effects Analysis for Refrigeration Device</b> R.X. Xu and Y. Liu	69
<b>Dynamic Analysis of Electric Spindle Based on ANSYS</b> L.L. Zhang and X.Y. Qin	75
<b>Study of Factors with Effects on Tracked Vehicle Driving Resistance Basis of Bekker Theory</b> C.B. Yang, L. Gu and W.W. Lv	80
<b>Design of Hydraulic System for Electrohydraulic Servo Valve Test Bed</b> D.H. Su and X.D. Tang	84
<b>Study on Collaborative Simulation Interfaces Applied in Caterpillar</b> J.C. Zhu and S. Zhu	88
<b>Contact Strength of Toroidal Drive with Cylindrical Teeth</b> S.P. Yang, Y.Q. Tan, Y.L. Pan, L.M. Li and J.G. Liu	92
<b>The Influences of the Volume in Asphalt Foam Device on Foaming Asphalt Characteristics in Cold Foam Asphalt Recycling Equipment</b> K. Li and S.J. Jiao	98

## Chapter 2: Advanced Mechatronic, Automation, Sensor, Control and Hybrid Electric Vehicles Applications

<b>Stability of Neutral Stochastic Delay Differential Equations with Infinite Delay</b> R. Hu and D.J. Shao	105
--	-----

<b>A Research on Detection and Identification of Harmful Gas Utilizing Cataluminescence-Based Sensor Array</b> L.S. Zhou	109
<b>Omni-Directional Vision System for Mobile Robot Using Structured Lights</b> Y. Zhang, Y. Li and Q.L. Wang	114
<b>An Automobile Exhaust Sensor Utilizing Cataluminescence on Nanosized Fe<sub>3</sub>O<sub>4</sub>/SiO<sub>2</sub></b> L.S. Zhou	121
<b>Overview Study of Multi-Dynamic Coupling Drive System on EV</b> X.H. Wu and W. Li	125
<b>Coordinated Motion Control and Auto-Grasp Planning of AUVMS Based Multi-Sensors Fusion</b> K. Yu, S. Liu and Z.C. Deng	130
<b>Electronically Controlled Air Suspension Bus Control System Design</b> F. Wang	137
<b>Powertrain Matching Based on Driving Cycle for Fuel Cell Hybrid Electric Vehicle</b> S.A. Gao, X.M. Wang, H.W. He, H.Q. Guo and H.L. Tang	142
<b>Design of Energy Saving System for Hybrid Power Loader</b> Q.H. Lv and X.Y. Xiao	148
<b>The Research of Height Control Strategy of the Electronically Controlled Air Suspension</b> J.R. Nan, Z. Chai and J.K. Huang	156
<b>An Automatic Aeroponics Growth System Based on Ultrasonic Atomization</b> J. Liu and Y.W. Zhang	161
<b>Monitoring and Control System of Variable Frequency Aeration Based on PID Control</b> J. Huan, X.Q. Liu, H.Y. Wang and H.Y. Wang	167
<b>New Highway Power Generation Device Based on Auto Wake</b> J.B. Xiao, W.G. Zheng and Y. Su	172
<b>Study on Powertrain Matching Based on Driving Cycle for Hybrid Electric Vehicle</b> X.M. Wang, H.W. He, H.L. Tang, H.Z. Qin and J.K. Peng	175
<b>Research on Construction Machinery Products' Color Imagery Based on Genetic Algorithm</b> C. Yao, Q.S. Xie and W. Zheng	183
<b>Research on Electromagnetic Actuator of Small Anti-Submarine Weapon</b> J. Xiong	188
<b>Review of Methods of Mechanical Digital Design Based on Topology Optimization</b> X.Y. Wang, H. Zhao, Z.F. Zhang and Y. Wang	193
<b>Research of Double Internal Model Control for High Speed Spindle</b> J. Meng, Z.Z. Lei and Z.L. Li	202
<b>Geometric Modeling of Spiral Bevel Gear under Virtual Reality</b> J.H. Wang, P.L. Yin, Q.C. Lao and Y. Huang	208
<b>Tea Flushes Identification Based on Machine Vision for High-Quality Tea at Harvest</b> X.J. Jin, Y. Chen, Y.Q. Guo, Y.X. Sun and J. Chen	214
<b>The Simulation Analysis of Control Performance on Closed-Loop Control the Digital Hydraulic Cylinder</b> D.H. Su, X. Li and Y.L. Wang	219
<b>Design and Implementation of Engine Waveform Tester Based on Virtual Instrument</b> J.G. Ma, H.Y. Song and J.L. Hou	223
<b>Automatic Analysis on Parametric of Truck Crane Boom Based on APDL and VB</b> Y. Fei, Y.J. Liu and Y.Y. Li	228
<b>The Simulation Analysis of the Efficiency about Truck Crane Lifting Load Sensing Hydraulic Loop</b> Y. Fei, B. Bian and Y.Y. Li	233

### **Chapter 3: Advanced Manufacturing Processes and Applications**

<b>Adaptive Slicing Algorithm Based on STL Model</b> X.D. Pan, K. Chen, Z.Y. Zhang, D.F. Chen and T.T. Li	241
<b>Modeling of the Hot-Pressing Process in the Production of Particleboard</b> X.J. Wang, H.P. Li and J. Cao	246

<b>An Uncertain Programming Model for Manufacturing/Remanufacturing Hybrid System in Reverse Logistics Environment</b> Y.J. Chen and D.B. Liu	251
<b>The Optimal Stretching Angle of Honeycomb Paper Core Based on the Fourth Strength Principle</b> J. Wu, Y.L. Wang, Y. Zhang, G.M. Zhang and Y.P. Du	256
<b>Research on Influencing Factors of Enhancing Independent Innovation Ability for Scientific and Technological Enterprises</b> X.D. Li, L.K. Shi, B.J. Yang, S. Wang and W. Hong	262
<b>Study on Load of Hollow Motor Shaft by 4-Roll Cross Wedge Rolling</b> Y.M. Yang, F.W. Cheng, J.C. Chen and J. Zhao	267
<b>Study on the Forming Mechanism for Second Step on Hollow Rotor Shaft by 4-Roll Cross Wedge Rolling</b> Y.M. Yang, J.C. Chen, F.W. Cheng and J. Zhao	271
<b>Research on the Model of Water Jet Propulsion Using Compressed Gas Based on Fluent Software</b> X.G. Zhou and J.H. Han	276
<b>Finite Element Analysis of the Extruder Die Axis Based on ANSYS</b> S.J. Hu, H.X. Zhang and D.L. Zhang	282
<b>The Pressure Design of Wet Shift Clutch Based on Thermoelastic Instability Analysis</b> X.Q. Zhang, H.Y. Li, C.S. Zheng, J.X. Zhao, B. Ma and K.L. Yang	287
<b>The Research and Application of Industrial Boiler Energy Efficiency Test System</b> H.W. Zhang, S. Dong, F. Yang and L.P. Shi	296
<b>Analysis on the Drop of PCB Packaged by Cushion Material Based on Finite Element Method</b> G.M. Zhang, H.Y. Guo, Y. Lou, Q.L. Tao, W. Yuan and J.D. Lu	303
<b>Experimental Study on Cooling-Air Grinding of High Speed Steel</b> Q.C. Lao and Z.Y. Shang	308
<b>Application of TRIZ Methodology in Solving Technology Conflicts of Rapid Folding Bicycle</b> Q. Sun, Q.S. Xie and Z. Li	313
<b>Prediction of Chip Morphology and Cutting Force during Prestressed Cutting of TC4</b> R.T. Peng, J.Y. Wu, X.Z. Tang and Y.Q. Tan	318
<b>Manufacturing and Microstructure of Cu Coated Diamonds/SnAgCu Composite Solder Bumps</b> Y. Zhong, W. Zhang, C.Q. Wang and B. Li	323
<b>Innovative Application Research on CNC Machining Technology in Mould</b> Y. Li, J.J. Qi and Y. Nan	328
<b>The Measurement of Shale Gas Content</b> Y.L. Jiang, H.Q. Xue, H.Y. Wang, H.L. Liu and G. Yan	333