

Table of Contents

Preface, Committees and Sponsors

Chapter 1: Design of Machines, Mechanisms and Industrial Devices

Crashworthiness Optimization for a Two-Layered Front Rail Considering Front Oblique Impact S.B. Hu, Y. Ding, J.R. Bao and P. Hu	3
Tooth Profile Design for Translational Meshing Motor R.H. Li	14
Innovative Design of Variable Visual Field Collimator Based on Conflict Resolution Theory of TRIZ C. Li, D.P. Yu, D.K. Wu, X.Q. Cao and J. Yao	19
Design of Mechanically Driven Non-Sinusoidal Mold Oscillation M.Z. Yu and X.K. Li	24
Reliability Model for Complex Mechanical Component Design L.Y. Xie, W.X. Qian and N.X. Wu	28
A New Type of Automatic Feeding Device for Biomass Briquetting Machine X.F. Xia, K. Wu, Q.P. Zhu, Y. Sun and Q.H. Jiang	32
Spraying Pattern Overlap and Movement Design of Automatic Electrostatic Top Spraying Machine H.Z. Han, Y.S. An, D.W. Zhang and W. Zhu	37
Finite Element Analysis and Topology Optimization Design for Front Platen of Injection Molding Machine E.G. Zhang	42
Application of Chaos Theory in the Garment Industry and Design H.Q. Jiao, S.Y. Chen, X.F. Sun and W.F. Wang	47
A Novel Design of Automatic Welding System for White Watermarks X.Q. Cao, D.P. Yu, C. Li and J. Yao	52
Design of the Oscillating Follower Cam Profile Based on NX8.0 E.G. Zhang	57
Design of the Flexible Container for Control of Sloshing M. Gradinscak	62
Design and Experimental Study of Swing Arm Vortex-Induced Vibration Generating Device L. Ma, P. Li, Y. Ma, X.Q. Ren, H.C. Ge and X.H. Li	66
Topology Optimum Structural Design of the Pedestal in the Electro-Optical Theodolite S.Y. Wang, J. Tang and H.G. Li	72
Vibration Isolator Design for Space Application Based on Multiobjective Optimization Method Z.W. Feng, Q.G. Tang and Q.B. Zhang	77
Structure Design of Coal Particle Washing Jet Pump Used in Coalbed Methane Wells and Basic Parameters Determination B. Liu, Y.G. Qi, S.Z. Meng, R.H. Mo, J.Y. Du, Y. Li, J.H. Sun, Z.D. Yuan, H.Y. Zhu and T.C. Wu	82
The Improvement of Refrigerators Rotary Oil Pump Y. Jing and F. Zhao	86

Chapter 2: Computational Technologies and Computer-Aided Design in Mechanical Engineering

Mass Station Technique Based on Further Development of Pro/Engineer L. Huo, J.Q. Ge and Z.W. Feng	93
---	----

Analysis on Quality Evaluation Criteria for Spline Curves S.J. Ji, J. Zhao, L. Zhang, H.J. Yu, X.L. Liu and X. Wang	99
Design Defects Immune Identification Methodology for Mechanical Products Based on Directed Graph of Assembly Constraint Relationship G. Lv, S.W. Fan, L.X. Zhou and X.N. He	104
Topology Optimization of Thermo-Mechanical Structure Using the Hybrid Cellular Automata Method J.Q. Zhan	111
Research of Design Evaluation Method Based on the Jack Human Model Y. Li, D.K. Chen, S.H. Yu and Z. Li	117
Parametric Human Body Model for Digital Apparel Design S.X. Wang, S.F. Qin, C.Y. Guan and S.H. Yu	121
Virtual Design of Rapid Sample Preparation Equipment for Textiles Based on SOLIDWORKS Y. He	125
Research on Knowledge-Based and Featured Mechanical Part Modeling W.B. Zhu, X.R. Wu, Y. Gan and L. Chen	129
The Research of Reverse Engineering Based on Geomagic Studio Z. Li, H.Y. Xiang, Z.Q. Li, B.A. Han and J.J. Huang	133
Parameter Mapping Method of the Skull Restoration Based on User Demand J.W. Liu, T.M. Guan, Y. Chen and L.J. Shan	137
Research on Injection Products Molding Defects Warping Based on Moldflow B. Yu and H.Q. Wang	141
Numerical Modeling of Fire Dynamic Behavior for a Five-Story Building C.S. Lin and T.C. Chen	145
Truss Structural Optimization Based on NLPQL and MIGA Y. Zhang and J.L. Xie	150
The Development of the ACIS-Based Deformation Modeling System and its Application J.L. Cao, S.Y. Chen, X.R. Yang, D.F. Ma and S.M. Luo	155
Dynamic Simulation and Optimization of Suspension Rig Based on ADAMS X.J. Zheng, J.X. Ma and X.H. Chang	160
Genetic Algorithms Study in Switch Electrical Appliances Electric Arc Feature Extraction J.S. Yu, L. Li and T. Liu	165
Opposition-Based Improved Harmony Search Algorithm Solve Unconstrained Optimization Problems H.G. Xia, Q.Z. Wang and L.Q. Gao	170
A New Variant Harmony Search Algorithm for Unconstrained Numerical Optimization Problems H.G. Xia and Q.Z. Wang	174
Opposition-Based Modified Differential Evolution Algorithm for Power System Economic Load Dispatch H.G. Xia and W.X. Ding	178
Modified Harmony Search Algorithm for 0-1 Knapsack Problems H.G. Xia and Q.L. Wang	182
Computational Modelling of Liquid Sloshing in Rectangular Tank M. Gradinscak and F. Jafar	186
On Starting Population Selection for GSAT A. Gorbenko and V. Popov	190
Study on the Improvement of Genetic Algorithm by Using Vehicle Routing Problem M.N. Guo	194

Chapter 3: Researches, Modeling and Analysis of Machines and Mechanisms

Finite Element Analysis of a Wind-Solar Hybrid Powered Street Light X. Xu, W. Wang and P.P. Fan	201
---	-----

The Dynamic Property Research of Ink System Based on Computer Simulation M.N. Guo	206
Rigid Rotor Dynamic Balancing by Two-Plane Correction with the Influence Coefficient Method X. Xu and P.P. Fan	211
The Analysis of Scrapping in Squeeze Casting Injection Device Based on FEM L. Song, M. Shao and L.Y. Huang	216
Analysis of Injection Molding Machine's Energy Consumption Based on Two Different Hydraulic Circuits G.N. Xi, M. Sun, J. Gao and Y.D. Zhou	220
The Study on Airborne Equipments Life Prediction Based on the Finite Element Simulation under Comprehensive Stress T. Ma, C.R. Li and S.L. Rong	224
Numerical Investigation of Interaction between Flexible Hyper-Elastic Structure and Fluid by Immersed Boundary Method J. Lv, C. Ran and D.W. Hao	229
Numerical Research about Two-Phase Flow under Different Acceleration in SRM with Embedded Nozzle X. Chen, H.F. Xue and Y. Luo	233
Finite Element Analysis of Glass Fiber Reinforced Plastic Hyperbolic Natural Draft Cooling Tower Y.L. Li, C.L. Meng, N.P. Wu and W.H. Zhang	237
Connections Checks of Pipe-Laying Barge Stinger System under Complex Loading Conditions T.F. Zhao, J.L. Qi, H.H. Zhou and M.L. Duan	241
The Deep Beam Bending of Rectangular Section under Concentrated Load Y.J. Chen	245
Analysis Methods of Mechanism Life from its Dynamic Performance T.Y. Ma and S.Q. Li	249
Dynamic Simulation and Analysis of Resistance Ring Correction Mechanism J. Qin and M.Y. Zhang	253
Magnetoelastic Effect Analysis of a Thin Current-Carrying Plate in an Invariable Magnetic Field Y.H. Bian	257
Co-Design Research on the Welding Structure of the Metro Bogie Z.M. Liu, W.G. Hu and Y. Chen	261
Model Updating of Dynamic Systems Using Structural Reanalysis Method K.B. Han and D.Y. Cho	268
Modeling of Railway Axle Box System for Thermal Analysis H.J. Yoon, M.J. Park, K.B. Shin and H.S. Na	273
The Influence of the Material Properties on the Hydraulic Spool Valve's Viscous Temperature Rise J.J. Yan, J. Ke, H.L. Liu, G.Z. Wang and D.H. Zhou	277
The Drive Axis Simulate Analysis on the Spiral Bevel Gear Milling Machine L.J. Yu, X.P. Li, F.Y. Liu and F. Zheng	281
Heat Sink Design for Thermoelectric Generation in Spindle Unit S. Li, Q.H. Zeng, X.H. Yao and J.Z. Fu	285
Dynamic Simulation and Experimental Research of High Pressure Pneumatic Valve in Gas-Driven Light Gas Gun Y. Liu, X.D. Song, X.X. Yao and K. Li	289
Tooth Contact Analysis of Parabolic Gears with New Type of Profile S.Y. Zhang and H. Guo	294
Research on Dynamical Characteristics for the Feed System Considering Nonlinear Friction Force J.J. Yang, Q. Wu, Z.Y. Rui and C.L. Lei	299
Dynamic Analysis of High-Speed Hybrid Thrust Bearings L. Wang	304

Three-Dimensional Analyses of Spur Gear Bending Stresses by Global-Local Finite Element Technique	
Y.Z. Xu, Z.X. Wu, S.A. Tian and Y.J. Hua	309
Dynamic Behavior of All-Ceramic Spindle-Bearing Unit with Preload	
S.H. Li, X. Li, M.H. Feng, Y.H. Wu and X.L. Jin	314
Influence of the Groove Width on the Aerostatic Dry Gas Seal	
H.J. Xu and P.Y. Song	318
Simulation of the Self-Adhesive Label Printing Pressure Based on Non-Linear Contact	
J. Yin	323
Analysis of Gear Static Transmission Error and Mesh Stiffness	
J. Yin	327
FEM Analysis of Contact for Converter Spherical Hinge	
X.P. Ren and J.D. Gao	331
Finite Element Analysis on Thermal-Stress in Lining Expansion Gap Setting Affects on 150t BOF Shell	
X.P. Ren and G.K. Wang	335
A Study of Shaft Vibration Based on Transfer Matrix	
C. Tan, Z.L. Guo and R.K. Zhou	339
Movement Function Reliability of Limit-Locking Mechanism of Space Cable-Strut Deployable Articulated Mast	
Z.Q. Tan, S.J. Wang and M.Y. Zhao	344
Simulation on Vibration Isolation System for Vibratory-Drum Test Stand	
Z.F. Zhang, H.G. Xu, X.N. Kong and Y.S. Yao	351
Static Characteristics of Micro Disc Magneto Electric Generator – Simulation and Experiment	
L. Du, G.C. Shi and J.J. Zhao	356
Structure and Development Trend of the Typical Aluminum Electrolytic Capacitor Casing Machine	
C. Dai, B.Z. Xia, Y.R. Liu and Z.D. Ouyang	360
A Simple Correlation Equation to Predict Pump Performance for Slurry	
P.C. He and P.Y. Song	365
Modeling and Simulation of Thermostatic Mixing Valve	
H.C. Chen, F.Y. Wu, P. Zhang, G.L. Xiong and Y.F. Zhu	370
Deformation Analysis of Beam Pipe Installation Mechanism for EPC	
L.B. Zhao and M.J. Shan	375

Chapter 4: Automotive Engineering

Influence of Rail Cant on Wheel-Rail Contact Relationship and Dynamic Performance in Curves for Heavy Haul Railway	
P. Wang, L. Gao and B.W. Hou	381
CFD Optimization Analysis of a Cooling Fan for Mining Dump Truck	
J. Yang, W. Xing and H.F. Fan	388
Analysis and Design of MRF Elevator Traction Transmission Device	
X.P. Zheng and S.M. Chen	395
Research on BP Based Fuzzy-PID Controller for Anti-Lock Braking System	
Y. Liu, L.Q. Jin, X.L. Liang and Z.A. Zheng	401
Research on Evasion Control of Vehicle Anti-Collision Warning System	
J.H. Wang, Y.C. Wang, H.F. Ding and F. Xie	407
Contact Mechanics in Cylindrical Clearance Revolute Joints	
C. Pereira, J. Ambrósio and A. Ramalho	412
Simulation on Vibration Friction Mechanism of Vibration Pile System	
Y.N. Teng, J. Li, L.Y. Xie and B.C. Wen	416
Numerical and Experimental Researches of 1:10 Tank Car Longitudinal Vibration with Fluid Sloshing	
Z.S. Liu, J.M. Zhang and Y.Q. Wang	420
Effect of Lubrication on the Erichsen Test	
G. Giuliano and F. Samani	425

Implicit Parameterization Modeling and Validation for Body-in-White of a Car D.F. Wang, F. Ji, S.M. Chen, Y.S. Li, H.B. Chen and X.M. Zhao	429
Study on Dynamic Roll Stability of Articulated Engineering Vehicle Based on Virtual Prototype W.J. Hao, G.Q. Wang, J.N. Qu and X.F. Li	435
Design on Vehicle Steering Mechanism and Research on its Steering Error Properties H.X. Wang and E.H. Dai	440
The Optimization Design of Opening and Closing Mechanism of Aerodynamic Braking in High-Speed Train C. Tian, M.L. Wu, C. Li and L. Zhu	444
Test Model of Automobile Engine Magneto-Rheological Mount Based on RBF Neural Network J.G. Ma, P.C. Sheng, H.Y. Song and C.L. Liang	450
A Comprehensive Study of Propulsion Torque Distribution for a Parallel Hydraulic Hybrid Heavy Bus Z.L. Zhang and J. Chen	454
Towards Knowledge-Oriented Smart Vehicle Adaptive Traffic Service J.S. Kim and J.H. Kim	459
Analysis on Evolution of Car Carrier Based on Theory of Technology Evolution M.Q. Zhang, D.M. Sun and Q. Wang	463
An Overview of Foreign Matter Invasion Systems for High Speed Railways Q. Su, W. Jiang, X.X. Zhang, Y.J. Li and L.L. Yang	468
Numerical Simulation of Influence of Different Deflectors on Aerodynamic Characteristics of the Heavy Duty Truck Y.K. Liu, Q.F. Li, G.Q. Li, A. Liu and X.J. Hu	474
Effect of Pretension on the Dynamics of Chain Drives C. Pereira, J. Ambrósio and A. Ramalho	478
Study on Vehicle Hook Buffer Mechanism Based on Sequential Image Analysis R. Li, P. Xu, Y.M. Zhong and L.X. Liu	482
Finite Element Analysis for a Certain Type of Vehicle Engine Shock Absorber Assembly Performance Based on ANSYS Workbench Y. Chen, J.J. Sun and Y.Q. Zhu	486
Research of Suspension Kinematics Based on Virtual Prototyping Technology Y.Q. Teng, C. Chen and M. Yuan	490
High Power Soft Switching Current Buck DC-DC Converter for Fuel Cell Electrical Vehicles D.L. Wang, Z.Y. Zhang and Y.G. Li	494
The Research of Sliding Boot Design Based on Compliance Characteristic J. Liu, F. Gao and G.Y. Xu	498
Plowing Performance Simulation and Analysis for Hybrid Electric Tractor H. Li, Z.H. Song and B. Xie	505

Chapter 5: Technologies and Organization of Production in Mechanical Engineering

Description and Smoothing of NC Motion Path Based on the Cubic Trigonometric Interpolation Spline J.M. Tao, A.P. Song and D.P. Yi	515
Research on Reliability Growth Technology of CNC Grinding Machine D.R. Zheng, J.W. Fan and X.X. Liang	522
Research on Manufacturing Process of Buried/Blind via in HDI Rigid-Flex Board X.H. Su, Y.M. Chen, W. He, S.X. Wang and Z.H. Tao	527
Research on Semantic SOA Framework Construction Oriented with Aviation Manufacturing F. Xu and S.S. Zhang	532
Research on the Combined Forming Process for Large Curvature Outdoor Antenna Reflector Elements S.M. Ren, D.S. Li, C. Jiang and C.L. Yu	536

The Green Design and Manufacturing Technology Based on the Recycling Theory J.R. Yang	541
Design Method Research on Green Modular that Oriented Remanufacturing Engineering J.R. Yang and Q.Y. Liu	545
Modeling and Simulation of Continuous Flexible Roll Forming Process Z. Sui, Z.Y. Cai and M.Z. Li	549
Planning and Scheduling Models for EMAS Productive Process P. Tang and H.B. Yu	553
Application of the Mond Index in the Safety Assessment of Obsolete Solid Rocket Motor Pretreatment Q.L. Han and Z.M. Zhu	557
The Improvement and Finite Element Analysis of Large Crankshaft Forging Process J.J. Wang, S.L. Hao, L. Pan and Y.M. Zhang	561
The Application of Three-Dimensional Digital Technology in Aircraft Assembly Process Design System H.J. Liu, Y. Ding and Q.M. Fan	565
An Experimental Study on the Effect of Die Chamfer Shape and V-Ring Position on Die Roll Height in the Fine Blanking of a Special Part with Various Corner Shapes J.D. Kim	569
Optimizing Maintenance Strategy of Multi-Stage Production System Based on Genetic Algorithm and Configuration N. Xie, M. Wiederhold, B.R. Zheng, W. Xue and P. Dittrich	576
Key Technologies Research on Section Display of Full 3D Gas-Assisted Injection Molding Simulation Results Q.H. Ren and T. Geng	580
Development of Fast and Non-Destructive Disassembling Equipment for LCD Framework Y.L. Wang, Q.Y. Wang, M.D. Gao and G.F. Liu	584
A Study on Manufacturing of Stiffened Cylinder J.U. Choi, W.H. Cho, J.H. Yoon, J.T. Yoo and H.S. Lee	591
Heat and Mass Transfer Measurements for Bio-Substrate Drying Processes R.Y. Jou	595
Simulation Optimization of Multi-Objective Flexible Job Shop Scheduling G.C. Wang, C.P. Li and H.Y. Cui	602

Chapter 6: Sensors, Detection and Measuring Technologies

Long-Distance Ultrasonic Ranging System Oriented to Tower Crane Anti-Collision X.T. Ju and L.C. Gu	609
The Real-Time Measurement System Design for the Axis of Rotary Kiln Based on Virtual Instrument Y.L. Wang, Z.S. Qi and M. Huang	613
Analysis of Major Defects and Nondestructive Testing Methods for Solid Rocket Motor J.W. Fan and F.T. Tan	618
Research on Axis Piezoelectric Six-Axis Force/Torque Sensor Clamping Device Y.J. Li, Q. Zhang and G.C. Wang	623
Development of Capacitive Position Sensing Geophone for Microtremor System W. Ding	627
Study on the Propagation Characteristics of Acoustic Emission in Point Contact Bearing Ball Y.Y. Xiao, W.X. Lu and F.L. Chu	634
A Measurement System for Si_{1-x}Ge_x/Si Multi-Quantum Wells Film J.Y. Zhang, T. Dong, K.Y. Wang, Y. Su and Y. He	640
Development of Experimental-Bed for Observation of Locomotory Small Animals X.D. Zhang, J.Q. Li and M. Zou	646
Study on Test Method of Interior Noise Caused by Body Panels H. He, H. Zhou and X. Li	650
Error Analysis of the ATOS 3D Optical Scanner in Vehicle Measurement X.D. Xie and W.L. Zhao	654

Design of Data Acquisition System for Fiber Optic Gyro Based on the FAT32 File System Y.B. Cai, H. Zha and X.T. Wei	658
Monitor System for Automatic Grouting of Metamorphic Concrete Based on PLC and HMI T.F. Cai, J.Z. Zhou, X.M. Wu, W.P. Peng and X. Wu	662
Camera Calibration Technique Based on HALCON Machine Vision X.P. Liu, Y.C. Chen and Z.F. Pang	666
Selection of the Appropriate Type of Sensory Equipment S. Sebenova, M. Šimúnová and K. Velíšek	672
The Research of RITS Time Synchronization Algorithms in WSN Y.P. Zhang, Z. Zheng, S.X. Zheng, Y.T. Huang and Y.H. Karanfil	676
The Hardware Devices in the Workspace of Intelligent Assembly Cell S. Sebenova, M. Šimúnová and K. Velíšek	684
Efficient Inspection Algorithm for IC Solder Joints Based on Feature Statistical Analysis H.W. Xie and K. Zhang	688
Research on Voltage Disturbance Detection of PV System Based on Mathematical Morphological and Backward Difference F. Yang and L.P. Huang	692
The Radome Detection Machine Tool Geometric Error Modeling and Measurement H. Wang, F.Y. Pan and C.Q. Pan	697
Study on Pairwise Bundle Adjustment and One Dimension Wand Calibration for Cameras Group X. Luo, W. Zhao and H.N. Zhang	702
A Calibration Method for the Logging Instrument Used in Harsh Environments Z. Huang, L. Kong, P. Zhang, X.N. Liu and C. Zhang	708
Geometrical Shape Analysis for Investment Casting Turbine Blade Based on Optical Measurement Y.Y. Cheng, Z.Z. Zhu and D.H. Zhang	716
Defect Classification Using Machine Learning Techniques for Flat Display Panels D.H. Cho and S.L. Lee	720
Applying Full Vector Spectrum for Electric Hoist Gearbox Fault Diagnosis H. Li, X.M. Dong, W.S. Hao, A.G. Liu, X.D. Yin and A.J. Wang	725
Defects Detection of Sheet Metal Parts Based on HALCON and Region Morphology B.A. Han, H.Y. Xiang, Z. Li and J.J. Huang	729
Rapid Analysis of Zinc in Soil with Long-NIR Spectroscopy L.J. Yao, J.M. Chen and T. Pan	733
Waveband Selection for NIR Spectroscopic Analysis of Zn^{2+} in Soil L.J. Yao, J.M. Chen and T. Pan	737
Design of Rail Vehicle Weighting System Using Pressure Sensor H.J. Yoon	741
The Research on Design and Manufacture of AC Resistor W.L. Chen, X.Z. Hou, S.Q. Wang, D. Liu and K.X. Sun	745
The Measurement and Analysis of Torsional Vibration for Rotating Machinery W.H. Yao and K.G. Zhao	750
Torque Balance Mechanism Applied to Oceanographic Profiler Y.H. Chen, S.R. Li and D.J. Gong	754
A Research of Rice Water Stress Index Based on Automated Infrared Thermography Technology M.C. Gao, W.Z. Zhang, Y.D. Han, C. Yao, Y.T. Wang, G.H. Ding, Z.Y. Zhang and J.Y. Bian	758

Chapter 7: Robotics, Automation and Control System

Advances in Research of Dynamic Modeling of Joints with Harmonic Drives for Space Manipulators N.Z. Wei, H.X. Sun, Q.X. Jia and P. Ye	767
The Humanoid Substation Inspection Robot Modelling Design T.B. Wang, H.P. Wang, H. Qi, P. Xiao and Y.Q. Luan	771

Motion Analysis and Research of Manipulator in Unilateral Suture Robot F.L. Yao, L.Y. Li and J.F. Yue	775
A Service Reliability Assessment Method for the Rigidity-Flexibility Coupling Open Arc Welding Robot X. Han, C. Li and X.G. Ma	780
Energy-Based Approach for Controller Design of Overhead Cranes: A Comparative Study N.Q. Hoang and S.G. Lee	784
An Overview of Coal Mine Rescue Robot and its Navigation Y.X. Qin, Y.Q. Wang, X.J. Chen and Z.G. Li	788
Structural Layout Design and Manufacture of a New Aerial Robot X.M. Zheng and X.S. Liu	795
Adaptive Control of Rubbing Rotor under Flow Induced Force D.C. Yao, L.M. Jia, Y. Qin and Y.Y. Zhao	800
Mechanical Design and Simulation of a Finger Rehabilitation Robot J.J. Yu, J.W. Qian, L.Y. Shen and Y.N. Zhang	805
Hardware Technology Research on Ultra-High Pressure Water Jet Ship Rust Control System Based on PLC L. Sun, Y.J. Gong, Z.M. Zhang and Z.W. Wang	812
Terminal Sliding Mode Control for Wind Energy Conversion System Based on Constant Tip Speed Ratio Y.M. Yang, Y.Q. Li and Y. Feng	817
A Novel Robotic Motion Control Strategy Based on Improved Fuzzy PID and Feedforward Compensation X.L. Jin, S.Q. Zhu, W.X. Wu and S.C. Luo	821
Wake Vortex Control Using Modified Flaps Y. He, J.W. Yang and F. Bao	827
The Application of Intelligent Industrial Robots in the Mine Research and Design R.M. Yang	835
Simulation Research on Load-Imitating Test Equipment for Hydraulic Drive Unit of a Quadraped Robot Based on Feed-Forward Decoupling Control L.X. Quan, D.Z. Tian and B. Yu	839
A Fuzzy PID Controller in the System of BLDCM L.F. Xu and Y.J. Han	847
Backstepping-Based Adaptive Fuzzy Sliding Mode Control for Autopilot Design J. Wang and M. Zhang	853
Research on Data Acquisition Method for Substation Automation J.Z. Liu, L.P. Qiao and L.J. Zheng	859
Study on Application of Interval Type 2 Fuzzy Logic Control for Gap Width Controller Used in EDM Machine K.T.P. Tee, R. Hosseinneshad, M. Brandt and J. Mo	863
On-Site Skill Examination System for Crane Operators Based on Distributed Cooperative Control Technology J.P. Feng, B.Y. Chen, Y.F. Jin and B. Pan	870
The Improved Design of Test Machine Linear-Velocity Closed-Loop Control Circuit C.H. Li, Y.T. Yu, S.Y. Ma and Y.C. Liu	874
Calculation Method of Shearer Space Pose Based on Triaxial Accelerometer and Single-Axis Gyro W. Guo, Y. Wang and S.F. Zhao	878
An Underwater Driving Mechanism Moved inside Y.H. Chen, S.R. Li and D.J. Gong	883
Study of Permanent Magnet Synchronous Motor Current Robust Control Based on Adaptive Fast Terminal Sliding Mode Control L. Qi, Y.Z. Yang, X. Bai, H.B. Shi and W.L. Liu	887
Research on Typical Methods of S Surface Controller Parameter Self-Tuning for Underwater Vehicles B. He, D.P. Jiang, G.C. Zhang and Y.H. Zhang	897
Cooperative Control of Multiple Autonomous Underwater Vehicles B. He and D.P. Jiang	905

Motion Reliability Analysis of the PUMA560 Series Mechanism C. Li, X.G. Ma, X. Han and G.B. Zhao	913
Industrial Sewing Machine Design and Development of Digital Design and Simulation Platform D.F. Zhang and Y.C. Gao	917
Efficient Simulation of Single Degree of Freedom Servomechanisms for Automatic Machines A. Vergnano, M. Marsala, A. Costantino and F. Balugani	921
System and Design of Five-Axis Water Jet Incremental Sheet Metal Forming Machine Tool H. Li, J.H. Li, K. He and R. Du	926
Stability and Stabilization of Discrete Switched Systems Based on Parameter-Dependent Lyapunov Functions T. Wang, S.P. Wu, Q. Wang and C.Y. Dong	932
Constrained Ruled Surface Reconstruction for 5-Axis NC Machining of Aero-Structure Q.Z. Bi, Y.A. Lu, Z.L. Li, L.M. Zhu, H. Ding and G. Liu	938
The Problem of Selection of Fingerprints for Topological Localization V. Popov	946
Automatic NC Programming for Chamfering Addendum of Spiral Bevel Gear Based on UG/Open X.T. Wei, J.P. Zhu and G. Li	950
A Power Management System for Thermoelectric Generators Used on Spindle Units of Machine Tools Q.H. Zeng, S. Li, X.H. Yao and J.Z. Fu	955
Variable-Frequency Pump Controlled Piston System for Box Jacking L.P. Pan and Z.N. Mi	959
Logistics System Simulation Optimization Process R.G. Dao, Z.J. Yu, B.G. Wu and B. Luo	963
Building the Panoramic Image for Mobile Robot Localization V. Popov and A. Gorbenko	967

Chapter 8: Applied Materials Science and Chemical Engineering

Residual Stress Analysis on Electrical Discharge Lapping (EDL) of Polycrystalline Diamond M.Z. Rahim, S.L. Ding and J. Mo	973
Research on the Impact of Temperature on the Softening Point of SBS Modified Asphalt X.W. Feng and D.W. Zhang	978
Thermodynamics of Calcium Phosphate Porous Scaffold on Beta Phase Tricalcium Phosphate Effects C.W. Chang, Y.S. Chen, W.Y. Wei and W.C. Chen	983
Air Oxidation of Porous Cu-35wt.%Ni-(5,10,15) wt%Cr Alloys at 650°C J. Chen, Z.H. Huang, Y.J. Ren, W. Wen, X.W. Xiao and Z. Zhou	987
Life Prediction and Verification under Multiaxial Fatigue Loading L. Wang, T.Z. Sui and Q.C. Tian	991
The Studies on Basic Element Design of Compound Material Surface Structure Models S.M. Xu, R.B. Ma, J.H. Du, J.H. Liu and Q. Jin	995
Effects of Sodium Hydroxide Treatment Duration on the Physical Properties of IRM®/Polylactic Acid Composite Filling Materials C.W. Lou, T.H. Chao, C.T. Lu, P.C. Lu and J.H. Lin	999
Influence of Heat Treatment on Microstructure and Tensile Property of Ti-5Al-5Mo-5V-3Cr-1Fe Alloy Y.Y. Fu, S.X. Hui, W.J. Ye and X.J. Mi	1003
Optimization of Thermoplastic Pre-Pregs Overmoulding P. Carreira, N. Alves, C. Ramos and P.J. Bartolo	1007
Measurement of Internal Residual Stress of the Laser Rapid Forming Parts by Incremental-Step Hole Drilling Method Y.B. Lai, W.J. Liu, Y.H. Zhao, F.Y. Wang and W.C. Han	1011
Effects of Resin Injection Speed on the Bubble Content of Glass Fiber Laminate J.W. Shi, J.J. Jiang and D.Z. Zeng	1017

Growth Retardation of Fatigue Crack by Cold Expanded with Ring Indented Method for AISI 304 Stainless Steel	
G.C. Shiah, G.Z. Huang and C.Y. Tseng	1021
Morphology of Poly(vinyl alcohol)/Graphene Nanosheets Composite Nanofibers	
C.L. Huang, S.Y. Peng, Y.J. Wang, W.C. Chen and J.H. Lin	1025
Study on the Dent Resistance of Warm Forming HSS Parts with Free-Form Surface	
Y.Q. Guo, M. Zhao, F.Z. Li, W. Chen and L. Chen	1030
Determination of B Impurities in Silicon by Inductively Coupled Plasma Emission Spectrometry	
Y. Liu, Y. Tan, L. Zhang, X.Y. Liu, Y.Q. Li and J.Y. Li	1035
Effect of Protein Variety on Properties of Gelatin Edible Films	
Q.N. Xun, Q. Lei, J.Q. Bao and Z.Y. Huang	1040
Effect of Twist Coefficient and Thermal Treatment Temperature on the Properties of PET Yarn	
J.H. Lin, P.C. Lu, J.J. Hu, Y.S. Chen and C.W. Lou	1046
Application of Porous Chitosan/Gelatin Bone Scaffolds Used in Bone Tissue Engineering	
C.W. Lou, S.P. Wen, H.Y. Chung, C.T. Lu and J.H. Lin	1050
Numerical Simulations of Micromechanical Properties of Al Alloy/SiC Hollow Sphere Syntactic Foams Composites	
Z.J. Lu, H.L. Wei, S.D. Liao and S.K. Lu	1054
Comparison of the Simulation and Experimental Mechanical Properties of B₄C-ZrB₂/Al Interpenetrating Phase Composites (IPC)	
Y.S. Wei, P. Huang, R.F. Yang and S.K. Lu	1058
Compressive Strength of Porous Bone Cement/Poly(lactic Acid) Composite Bone Scaffolds	
C.W. Lou, W.C. Chen, C.T. Lu, C.C. Huang and J.H. Lin	1062
Comparative Sound Absorption and Thermal Insulation Properties of Compound Fabrics	
J.H. Lin, T.T. Li, J.Y. Lin, M.C. Lin and C.W. Lou	1066
Investigations on Dynamic Puncture Behaviors of Integrated Composite Reinforced with Varying Fabrics	
C.C. Lin, T.T. Li, C.W. Lou, J.Y. Lin and J.H. Lin	1070
Mechanical and Electrical Properties of the Polyaniline (PANI)/Poly(lactic Acid) (PLA) Nonwoven Fabric	
C.M. Lin, C.H. Lin, Y.T. Huang, C.W. Lou and J.H. Lin	1074
Effects of Processing Parameters on Constant-Rate Puncture Resistance Behaviors of Compound Fabrics	
C.W. Lou, T.T. Li, J.Y. Lin, M.C. Lin and J.H. Lin	1078
Effects of the Content of High Strength Polyethylene Terephthalate Fiber and Kevlar Fiber on Properties of Geotextiles	
W.H. Hsing, C.W. Lou, C.W. Lin, J.M. Chen and J.H. Lin	1082
Property Evaluation of PET Fiber and Metal Fiber Composite Woven Fabric	
Y.J. Chang, B.C. Shiu, J.H. Lin and C.W. Lou	1086
An Integrated Manufacturing Process of CFRP Parts Based on RFI and Cutting Process	
Y.Q. Guo, Z. Meng, F.Z. Li, W. Chen and J. Guo	1090
Phase Transformation of MgAlON-SiAlON Powders Synthesized by Carbothermal Reduction-Nitridation from Ludwigite Tailings	
T. Jiang, L. Zhang, Y. Tang, Y. Xia and X.X. Xue	1095
Super-Hydrophobic Film Prepared with Reduced Graphene Sheets and its Application as Corrosion Barrier to Copper	
P. Wang and D. Zhang	1100
Tensile Strength Characteristics on ETFE Film for Membrane Roof System	
S.J. Lee and S.D. Shon	1106
Enhancement of Corrosion Resistance of PEO Coating on AZ91 Biomedical Magnesium Alloy by Surface Laser Treating	
M. Wang, Y.L. Wang, Z.D. Liu and H. Ding	1110
Fabrication of Al₂O₃ Ceramic Coating on AZ91 Biomedical Magnesium Alloy and the Corrosion Resistance in SBF	
Y.L. Wang, S. Wang, M. Wang, L.J. Shi, H.R. Guo, Z.J. He and X.F. Shi	1114
NGV. Using to be Alternative Energy in Metal Melting	
S. Prasertsook, P. Saranan, N. Udomsree and N. Sukachart	1118

Influence of Centrifugation Time and Force on Monodispersion of MWCNTs Aqueous Solution	1122
S.W. Lu, X.J. Zeng, P. Nie and C.X. Zhang	
Deform Based 1Cr18Ni9Ti Pipe Joint Upsetting Extrusion Process Finite Element Numerical Simulation Analysis	1128
Z.Y. Huo, Y.Z. Li, X.Q. Sun and Q. Wang	
The Development of Small Size Double Side Metal Plate with Internal Structure Utilizing Metal Injection Molding Process	1132
K.H. Shin, Y.M. Heo and J.D. Kim	
Experimental Study on Indium Recovery from Discarded TFT-LCD Panels	1136
Y.L. Wang, F.Q. Chen, K. Zhao, H.J. Hu and G.F. Liu	
Algorithm Design of Four-Step Three-Dimensional Braided Composite Structures in Matlab Environment	1144
C. Deng, J.J. Jiang and L.C. Fang	
Impact-Resistant Polypropylene/Short Glass Fiber Composites with Far-Infrared Emission: Manufacturing Technique and Property Evaluation	1148
J.H. Lin, Z.Y. Lin, J.M. Chen, C.H. Huang and C.W. Lou	
Manufacturing Technique and Property Evaluation of Resilient Nonwoven Fabrics	1152
C.W. Lou, S.Y. Huang, C.H. Lin, Y.C. Yang and J.H. Lin	
Manufacturing Technique and Property Evaluation of Eco-Friendly Kevlar/PET/Nylon Composite Geotextile	1157
C.W. Lin, W.H. Hsing, C.W. Lou, J.M. Chen and J.H. Lin	
Manufacturing Technique and Property Evaluation of Polyester/Polypropylene Fasciated Yarn Used in Geogrids	1161
J.M. Chen, C.W. Lou, C.W. Lin, W.H. Hsing and J.H. Lin	
Manufacturing Technique and Property Evaluation of RFPET/TPET Hybrid Nonwoven Fabric	1165
J.H. Lin, Y.L. Hsing, W.H. Hsing, J.M. Chen and C.W. Lou	
Manufacturing Technique and Antimicrobial Activity of Silver Nanoparticles	1169
A.P. Chen, C.W. Lou, Y.Y. Chung, M.C. Lin and J.H. Lin	
Manufacturing Technique and Properties Evaluation of Ni-Coated Copper Composite Fabrics	1173
A.P. Chen, P.W. Hwang, C.W. Lin, T.A. Lin, Y.Y. Chuang and J.H. Lin	
Processing Technology and Characteristic Evaluation of Absorbent Cotton	1177
J.H. Lin, Z.H. Wu, C.T. Lu, T.T. Li and C.W. Lou	
Predictive Modeling of Minimum Quantity Lubrication: Cutting Force, Temperature and Residual Stress	1181
X. Ji, X.P. Zhang, B.Z. Li and S.Y. Liang	
Effects of Lubricant Viscosity-Temperature Relationship on the Capacity of Sliding Bearing	1185
X.F. Dong, B. Lin and G.W. Zhang	
Evaluation of the Coulomb Friction Coefficient by the Erichsen Test	1190
G. Giuliano	
Structural Optimization Design of the Arc Finger Seal	1194
F. Qi and H. Su	
Microstructure and Electrochemical Properties of $\text{La}_{0.7}\text{Mg}_{0.3}(\text{Ni}_{1-x}\text{Co}_x)_{3.5}$ ($x=0.0-0.2$) Type Hydrogen Storage Alloy	1198
X.Y. Zhao	
Analysis of Influence Factors on Springback for Blade of Stamping Welded Hydrodynamic Torque Converter	1203
Y. Tan, W.X. Ma and T.M. Yu	
Free Vibration Analysis of Carbon Nanotubes by Timoshenko Beam Model and Thin-Plate Spline Radial Basis Function	1207
F. Wang, L.N. Xu and S.B. Sui	
An Analytical Method of Analyzing the Heat Conduction for the Unequal Cross-Section Straight Fin	1211
F. Zhang and P.Y. Song	
The Design and Optimization of Nonwoven Composite Boards on Sound Absorption Performance	1217
C.H. Huang and Y.C. Chuang	

A Study of the Effect of Forcipomyia Taiwana Repellents Made of Plant Extracts C.W. Lou, M.C. Sie, C.T. Lu, H.L. Kuo and J.H. Lin	1221
Effects of Warp-Knit Structure on the Properties of the Elastic Bamboo Charcoal/Stainless Steel Warp-Knitted Fabrics J.H. Lin, Y.T. Huang, C.H. Lin, C.M. Lin and C.W. Lou	1225
Ship Welding Defect Analysis and Quality Control Y. Jing and L.M. Yu	1229
The Characteristics of Titanium Alloy Chip-Breaking by Orthogonal Cutting with a Surface-Textured Cutting Tool J.F. Zhang, Z.M. Chen, P.F. Feng and W.H. Xu	1235

Chapter 9: Product Design

Interpretations to the Esthetics of Exposed Symbol in Product Design Z.L. Yang and F. Bian	1243
A Method of Cultural Creative Product Design Based on Reverse Engineering L. Yao, C. Jiang and S.H. Yu	1247
Product Innovation Design Method Based on Pan-Ethnic Group Design Gene C. Jiang, L. Yao, S.H. Yu and D.K. Chen	1251
Research on Market-Oriented Souvenirs Development Strategy L. Ding, C. Jiang, X.T. Zhao and L.L. Chen	1255
Design Planning and Top-Layer Design of Products B.C. Wen, X.P. Li, S.Y. Liu, W.Z. Wang and Z.Y. Wang	1259
Harmonious Design Method of Product and its Applications B.C. Wen, X.P. Li, S.Y. Liu, W.Z. Wang and Z.Y. Wang	1266
Research on Tourist Souvenirs Design Method Based on Gene Engineering X.T. Zhao, C. Jiang, L.L. Chen and J.J. Gao	1274
Research on the Selection Method of Tourism Cultural Souvenir Products Types Based on Multiply Drive Factors J.J. Gao, C. Jiang, L.L. Chen and L. Ding	1278
Product Evolution Design Oriented Quality Characteristic Positioning Based on Two-Dimensional Space G.J. Duan and Y. Wang	1282
A Brief Historical Review of Western Approaches to Energy Design before Professionalism J. Landler	1289
Computer-Integrated Manufacturing for Chinese Herbal Medicine Drinks Products Z.P. Ho, I.C. Lee and J.J. Chen	1294
Production Processes Design Hybrid Depth Interview-Glutinous Rice Processors for Examples Z.P. Ho, Y.E. Wu and J.J. Chen	1298

Chapter 10: Other Themes of Research

Design and Application of a Secure Chip Key Issuing System B. Zhao, F. Zhai, W. Cen, Y.J. Lv and X.B. Liang	1305
Damage Radius Study of Gimbaled Forward-Firing Warhead to Tactical Ballistic Missile Z.B. Shi, M. Gao and L.J. Han	1312
On Energy Harvesting Characteristics of Cymbal Transducer Y.C. Chen, M. Gao, W.B. Yu and L. Zhang	1318
Congelation Risk Assessment of Oil Pipeline on Basis of Improved Monte-Carlo Method X.L. Li, Y. Wang, W.K. Su and Q.L. Cheng	1324
SIGSO Satellite Tracking Characteristics of Large-Diameter Parabolic Antenna J.X. Cui, H.L. Shi, C. Lv and R.Z. He	1328
The Research of the Rehabilitative Exercises System of Residual Limbs Based on EMG Sensor Q. Wang, Z. Lan, X.F. Zhang and Y. Ma	1332

Optimize the Multi-Dimensional Test Coverage Based on Multiple Attribute Decision Making and Cross Entropy Method Y. Zhang, G. Wang and P.R. Lin	1336
Evaluation of Spherical Parameterization Methods for Three-Dimensional Reconstruction of Medical Images X.H. Wu and Z.X. Hao	1342
Study on Bio-Pharmaceutical Industry Development Route and Strategy Y.L. Mei and P. Gui	1350