

Table of Contents

Preface, Committees and Reviewers

Chapter 1: Manufacturing and Engineering Management

Design of Skid-Mounted LCNG Fueling Station for Vehicle J.X. Yang and X.J. Li	3
Innovation Application Research on the Computer Technology in Machinery Manufacturing L. Tan	8
Study on Technology Innovation Process Integration Based on Technological Growth Curve Y.Q. Wang, N.L. Hu and L.P. Li	13
Research and Practice on the ‘Case-Run through Type’ Teaching Model of Machinery Manufacturing B. Zhong	18
The Inverse Optimal Allocation Model of Manufacturing Resource for Small and Medium-Sized Manufacturing Enterprises in Grid Environment P. Lin and X.B. Zhang	22
Evaluation Research of the Control Effectiveness of Underground Defensive Projects Thermal and Humidity Environment J.Y. Liu, H.X. Wang, N. Wang and L. Zhou	28
Research on Multi-Segment and Multi-Class Seat Inventory Control with Overbooking D. Wang and C.Y. Liu	34
Research on Power Life Cycle Asset Management Mode and MEE Comprehensive Evaluation Mode S.Q. Liu	39
The Research and Development of Water Jet Technology S.D. Luo and Y.J. Xu	45
Analysis on Two Impelled-System Model in Structure of Forestry Industry S. Ding, L.T. Liao and Z.M. Wen	49
A New Study of China's Advanced Water Injection Technology for Low-Permeability Reservoirs L. Tian, M.X. Ma and S.L. He	55
Early Warning System of Power Grid's Running Risk of Hebi Power Supply S.Q. Liu	60
IoT-Based 4PL: Prospects and Business Models H. Yang, Y.H. Zuo and Y.R. Li	65
Development Status of Hydrogen Energy and Application Prospects S.S. Li	70
Application of Lithium-Ion Battery Technology to the New Energy Vehicles J.P. Wang	75
Research and Development of Fuel-Saving Technology of Automobile Gasoline Engine B.G. Liu	81
A Study on Contractual Relationship Handle and Control in Constructional Engineering Disputes Q.J. Sheng	86
CPSO-SVM Based Petroleum Demand Prediction L.F. Tang	91
RFID-Driven Graphical Method for Describing the Time-Sensitive State and Position Changes of WIP Material Flows in a Job-Shop Floor W. Cao, P.Y. Jiang, J. Sauser and J. Deuse	97

Chapter 2: General Mechanical Engineering

The Study on Waveform Sets Transmission for Multistatic Radar F. Xie, X.H. Ye and F. Liu	105
A Study on Elevator of Li-Ion Power Battery Formation Equipment L. Han, F. Xiao and B. Hu	111
Study on the Intake Wind Performance Experiment of the Pipe with High Pressure Spray A.P. Zhou and D.S. Wang	115
Improved Artificial Potential Field Method Manipulator Inverse Kinematics D.J. Huang and T. Liu	119
Study on Wear Mechanism of Chromium Carbide Coating Reinforced Cast Iron Cylinder Sleeve Z.B. Ye, S.G. Qu, Y. Hu and G.H. Wang	124
Use of Engine Waste Heat Energy Utilization Rate of Engine is Improved F.L. Jun and F.G. Bin	129
Dynamic Modeling and Motion Characteristic Analysis of Spherical Robot Y. Shi, T.H. Li and H. Pan	133
Effect of the Friction Coefficient on Large Strain Extrusion Machining P. Lin, Z.C. Xie and Q. Li	138
3D Numerical Simulation on the Variable Swirl Intake Process of Diesel Engine Y. Fan, D.X. Liu and L. Wang	143
Study on Error Analysis of Parallel Machine Tool Based on Monte-Carlo Method J.W. Zhao, Q. Zhang and G.Q. Chen	148
A Study on Process of Modular Li-Ion Power Batteries H. Liang, X. Feng and Y.A. Li	153
Numerical Simulation and Improvement of Diesel Pneumatic Motor Inlet Duct Q.C. Liang, T.J. Ren and W.Y. Lin	157
Fractional Order Generalized Electro-Magneto-Thermo-Elasticity with Magnetic Monopoles and Geometrical Nonlinearity Y.J. Yu and X.G. Tian	162
Effect of Stabilizing Fins on the Indexes of Ship Manoeuvrability L.J. Yang, Z.C. Yang, X.R. Gao and Y.H. Tao	167

Chapter 3: Mechanical Transmission, Vibration and Noise

Simulation Analysis of Spiral Bevel Gear Tooth Surface Generation Based on VERICUT Z.B. Hong, Z.J. Yang, B.C. Wang and X.C. Zhang	175
Analysis of Helicopter Main Reducer Planetary Gear Contact Strength P. Liu, Y.M. Li, K. Huang and Q. Chen	180
Research of the Seismic Wave Data Processing Based on the Wavelet Transform D. En, N.N. Wei, H.H. Wei, X.L. Shi and C.S. Zhou	184
De-Noiseing Method of Acoustic Emission Signal for Rolling Bearing Based on Adaptive Wavelet Correlation Analysis X. Li, X.J. Li and G.B. Wang	188
Finite Element Analysis for Vibration Characteristic on Gear Rotors H.Y. Qi and L. Liu	193
Single Spur Gear Reducer Optimization Design Mathematical Modeling Y.X. Wang	198
Study on the Simulation of Radial Tire Vibration Noise G. Tong and X.X. Jin	203
The Virtual Prototype Design of the Micro Gear Box Mapping Stacker Base on Solid-Works Y.S. Feng, R.G. Hou, Z.Y. Li and G.Y. Zhao	208
The Research of Balance Suspension Failure Form H.B. Zhang	212
Research and Study of Gear Class Components Parametrization Based on AutoCAD J. Li	217
Tribological Properties of MoS₂ Thin Coatings under Liquid Lubricating Y. Bai and P. Cao	221

Analysis on the Stiffness of Leaf Spring Based on ABAQUS H.B. Zhang	225
Development of Engine Vibration Test Virtual Instrument X.Y. Liu	230
Semi-Discrete Analytical Solution of Lumped Mass Finite Element Method for the Longitudinal Vibrations of an Elastic Bar J.S. Pan and J.C. Wang	234
Discuss BMW Automatic Transmission Work Principle and Fault Handling C. Chen	240
Realizing Method of MATLAB Software for Fault Diagnosis of Freight Bearings C.C. Chen	245
Improved K-Means Clustering Method Based on Complex Network for Rolling Bearing Fault Diagnosis Y. Pan, A.H. Chen and L.L. Jiang	250
Analysis and Manufacture of Skew Bevel Gears with Spherical Involute B.C. Wang, G.C. Zhang, Z.J. Yang, Y.K. Wang, Y.Q. Zhang and C.D. Tian	255
Fault Diagnosis of Rolling Bearing Based on Feature-Level Fusion Method L.L. Jiang, H.K. Yin and S.W. Tang	260
An Improved HHT Method and its Application in Fault Diagnosis of Roller Bearing L.L. Jiang, B.B. Li and X.J. Li	264

Chapter 4: Electrical and Electronics Engineering

The Application of Hybridized DC-DC Converters in the Power Supply System of Spacecraft N. Qing and W.G. Wang	271
Power System Based on Multi-Agent Technology X.Z. Fan	276
Global Robust Terminal Sliding Mode Control for PMLSM Servo System H.P. Han, W. Wang and Z.M. Bai	280
Capacitor Optimization of the Single-Phase Capacitor-Run Induction Motor X.D. Wang, B.B. Hao, X.Z. Xu and Q.H. Gao	286
Starting Performance Analysis of Line-Start Permanent Magnet Synchronous Motor with Novel Rotor Structure X.Z. Xu, Y.H. Cui, X.D. Wang and Z. Zhang	291
Design on Digital PWM Inverter Power Based on SA4828 X.H. Wang, X.J. Li and S. Wang	296
Fault Diagnosis of Cascaded Converter Based on Wavelet Packet RBF Neural Network X. Wang, J. Xu, G.D. Zhang and R.M. Qi	300
Performance Characterization of the Novel Topology for High-Frequency Isolation Bi-Directional DC/DC Converter P.H. Jing, C. Wang, J. Wang and F. Zhao	305
Voltage-Mode Multi-Valued Schmitt Trigger with Neuron-MOS Transistors G.Q. Hang, X.C. Zhou, D.Y. Zhang and Y. Yang	310
Parameters Optimization Design of Four-Switch Three-Phase Shunt Active Power Filter X.G. Tan, G.M. Feng, L. Zhang and L. Cao	316
Research on Current Signal Acquisition of Soft-Start Controller J.H. Guo and L. Li	322
Five Level Photovoltaic Grid-Connected Inverter Based on Repetitive and PI Control H.Z. Yang and S.Z. Yuan	327
Medium Voltage Distribution Network Voltage Grade Sequence Comprehensive Evaluation Based on Gray/Ahp X.H. Ma, B.Y. Yan and Y.S. Wang	332
Calculation of 3D Airgap Magnetic Field Distribution of an Axial Flux Permanent Magnet Motor X.F. Shangguan and K. Zhang	338
Design and Simulation of the New Three-Phase Voltage Source PWM Rectifier Y.M. Zhang, Z.H. Zeng, F. Yu and J.L. Feng	343

Research on How to Send Ladder Derived by Linear Electric Motors Y.F. Luo and Y. Liu	350
Research on Temperature Field of Variable Frequency Motor Y.H. Wu, X.M. Liu, X.F. Meng and H.T. Zhao	355
The Simulation and Realization Methods of Partial Discharge Signal in Gas Insulated Substation Y.X. Yun, S.P. Li and K.J. Li	360
A New Approach of Determination of Comprehensive Weight in Condition Assessment of Power Transformer B.G. Zhao, X.H. Zhao, C.Z. Wang, C. Tian, X.L. Zhao and K.J. Li	365
Novel Low-Pass Microwave Filter Based on Rectangular Ring DGS B.P. Li and Y.L. Zhang	371
Research and Design of One New Type of Satellite Antenna Unit H.Y. Zhang, L. Wang and M.F. Shi	375
Research and Design for 2D-FFT Processor Based on FPGA X.Y. Cheng, J. Yang and Y.H. Zuo	379
Study of Harmonic Suppression Method Based on the Class D Amplifier Y. Guo and W. Li	384
Study on Preventing Override Trip System for High-Voltage Power Grid of Coal Mine Underground Based on the EtherCAT Y.M. Wang, X. Yang and H. Zhang	389
Study on Fluctuation Reason of DC-Side Voltage of Active Power Filter and Stability Control Y.L. Ai, S. Xu and F. Zhang	394
Analysis of a Novel Isolated Input-Series and Output-Series Full-Bridge Bidirectional DC/DC Converter X.Y. Zhao, C. Wang, F. Yang and S.K. Wang	399
Simulation Research on Multisim10-Based Microcontroller H.J. Tang	404
Fault Diagnosis of Motor Rotor Based on Fuzzy C-Means Clustering Analysis Y.X. Cao, X.J. Li and L.L. Jiang	409
Flux and Speed Estimation Based on the Extended State Observer for Speed Sensorless Control of Indirect Field Oriented Induction Motor Drives W.X. Wei and X.P. Zhang	414
Simulation Research of Vector Control System Based on the Improved MRAS Speed Sensorless L.X. Yang and J. Zhang	419
Research of Calibration Instrument of Multi-Site Single-Phase Energy Meter T. Hou and Y.H. Guo	424
Adaptive Filter with Multiple-Scale Decomposition Rotor Broken Bars in Induction Fault Diagnosis D. En, X.L. Shi, H.H. Wei, N.N. Wei and C.S. Zhou	428
Study on the Characteristics of Asynchronous Motor Vector Control H.C. Feng, X.D. Wang, X.Z. Xu and J.K. Si	434
Research on Cascade Multilevel Inverter Control Strategy Z. Zheng and F. Yan	439
The Self-Control Device Design of the High Tension Overhead Live Working Dor Accurate Pinpoint B.L. Liu, X.J. Li and K.F. He	444
Application of Active Disturbance Rejection Cotroller in Sensorless Vector Control System of PMSM S.G. Xue and X.Z. Sun	449
The Hardware System Design of PMSM Controller Based on DSP2812 J. Zhu, W.K. Li, H.X. Wang and L.L. Han	454

Chapter 5: Materials and Raw for Manufacturing

Investigation of Thermomechanical Behaviors of Epoxy Shape Memory Polymers by Molecular Dynamics Simulation H. Yang, K. Zou and X.Y. Liang	463
Narrow-Band-Gap Polymer Photovoltaic Materials Synthesis and Photovoltaic Research Y.S. Wei	468
ICP-AES Determination of the Four Trace Elements (Al, Ca, P, Ti) in the Ferrosilicon Y.F. Wu, Y.J. Jia, H.H. He and P. Liu	473
Association between Genetic Polymorphisms of 5,10-Methylenetetrahydrofolate Reductase and Cytokinesis-Block Micronucleus in Peripheral Blood Lymphocyte among 1,3-Butadiene Workers N. Liu, X.S. Wang, J. Cheng, J.W. Xiao and B. Li	478
Study on the Geological Conditions of Uranium Mineralization in Guojiaping Y.G. Huang	483
Synthesis of Hyperbranched Polymeric Bactericides X.X. Li, J. Chen and J.Z. Jia	488
Analysis and Research of the Ductility Performance of the Steel Reinforced Concrete Structure Based on the Filling Technology M. Huang	492
The Analysis of the Built-in Electric Field and the Migration of Carries in Thermal/Electric-Field Poled Fused Silica Z.Q. Dai, J.Y. Duan, J. Wang, Y. Li and Y.T. Ren	496

Chapter 6: Sensors and Intelligent Instrument

A Received Signal Strength Indication Adaptive Algorithm for Wireless Sensor Network H. Huang and B. Luo	505
Study on Displacement Measurement for Induced Strain Field Based on Digital Speckle Pattern Interferometry Method J. Liu, H. Zhang, J. Li, D.C. Chen and Y.K. Tang	510
Coupling Efficiency Analysis of Different Top Coupling Grating for Quantum Well Infrared Photo-Detector Y.L. Yang and G.D. Wang	515
Based on Base Station Control Management Protocol in Heterogeneous Sensor Network Z.P. Liu	519
Research of MOEMS Pressure Sensor D. En, C.S. Zhou, H.H. Wei, N.N. Wei and X.L. Shi	524
A Design of Carbon Oxide Sensor in Mine W.P. An and L. Xing	528
Research on Micro Inertial Sensor Error Compensation Technology in SINS J.M. Zhang and X.H. Zhang	532
Application of an Improved DV-Hop Algorithm on the Wireless Sensor Network of the Mine Shaft G. Li	537
Hoist Positioning System Based on the Acceleration Sensor F.Z. Wang, F.K. Zhang and L.M. Zhang	542
Automatic Counting System Based on MCU Y.M. Ying and X.H. Yang	547
Authentication Scheme between the Vehicle Alarm with Remote Control and Mobile Phone Q.Y. Niu, W.Y. Zhang and M.Z. Shang	551
Research on Micromechanical Machining Technology of Micro-Flow Sensor H. Lv and S.B. Liu	555
Improved Vision-Based Algorithm for Unmanned Aerial Vehicles Autonomous Landing Y.J. Zhao and H.L. Pei	560
Study on the Hardware Initialization of Embedded System H. Liu and Y.B. Fan	566
The Research about Image Enhancement of the Cylindrical Workpiece Based on Matlab Q. Wu, H.B. Guan, J.N. Gu and F. Fan	570

The System Development on Automatic Programming of Numerical Control Lathe Based on AutoCAD	
N.Y. Zhan and X.Q. Xie	574
High Security Design of 2.4GHz Remote Controller in Car Anti-Theft	
W.Y. Zhang, Q.Y. Niu and M.Z. Shang	579
Modeling of In-Body Propagation Characterization for 2.5/3.5 GHz Implantable Devices Applications	
B.L. Wei, H.W. Yue, Q. Zhou, W.L. Xu, X.M. Wei and J.H. Duan	583
CT Based Three Dimensional Geometric Model of Cervical Spine	
Z.Y. Yan, D.M. Wu, L.T. Zhang and J. Zhao	588

Chapter 7: Detection and Diagnosis

Study on the Artificial Intelligence Diagnosis System of the Coal and Gas Outburst Risk Level	
T. Li and F.Z. Wang	595
Precision Parts Parallelism Error on-Line Detection Based on the CCD Imaging System	
X.F. Feng, Q. Zhang and Y.J. Liao	599
Analysis in the Mercedes-Benz Automotive Fault Diagnosis	
J.P. Wang	604
Application Study of Metal Magnetic Memory Testing in the Q345E Steel Weld Inspection	
P.L. Zhang, W.K. Wang, Y.P. Wang and L. Cao	609
The Research of Effects on the Performance Parameters of the Quadrupole Mass Filter	
R.P. Ma and C.Q. Sun	614
Part Roundness Errors Evaluation Based on Modified Simplex Method	
X. Huang and L.S. Li	619
Experimental Study on Monitoring Steel Beam Local Corrosion Based on EMI Technique	
J.W. Yang, H.P. Zhu, J. Yu and D.S. Wang	623

Chapter 8: Control and Information Engineering

Study on Predictive Control Algorithm of Reactor Temperature	
M.Q. Li and Y.X. Yu	631
Study on Robust Control Technology of Opto-Electronic Tracking System	
M.Q. Li and R.C. Sun	636
Parking Guidance Control System Based on Internet of Things	
R.C. Sun, Y. Piao, Y. Wang and H. Wang	641
Study on the Composition and Control of Robot Structure	
B. Feng	646
Design of Three-Tank Liquid Level PID Control System Based on Virtual Instrument	
Y.X. Yu, M.Q. Li and Z.Y. Zhao	650
Research of Fuzzy Self-Turning PID Control Based on FPGA	
Y.K. Yu and X. Kong	654
Fuzzy Adaptive PID Control for Parallel Machine Tool	
J.D. Zhang, R. Tang and Y.Q. Wei	660
Intelligent Shading Control System Based on the Lonworks Bus	
A.M. Xiong, F.Y. Li and X. Xie	665
Study on Control Strategy for Regenerative Braking of Electric Vehicles	
Z.Q. Zhai and X.N. Zhang	669
Design and Implementation of Remote Monitoring System for Drinking Water Quality in Country	
D.J. Huang, T. An and W. Chen	673
The Fuzzy PID Control of Resistance Furnace Temperature System Based on Genetic Algorithm	
J.Y. Liu	678
Adaptive Fuzzy Sliding Mode Control for Uncertain Inverted Pendulum System	
J.L. Zhang and W. Zhang	683

Application of Fuzzy Neural Network PID Controller in Networked Control Systems Z.Y. Fu, L. Wang and L. Wang	689
Capacitance-Based Design of the Tap Water Flow Control Device Y.Q. Zhang, Y.F. Luo, M.F. Lin and W. Xiong	694
Stable Adaptive Control Strategy in Thrust System of Shield Machine R. Hu, G.F. Gong, L.T. Wang and X. Yang	699
Design of Direct-Control Hydraulic Cylinder Speed Control System Base on High-Speed On-Off Valve Q.H. Gao, Z.H. Liu, Y.J. Shao and T.Q. Dong	704
Research on S-Curve Speed Control for Step Motor Based on the MCU L.J. Q and B. Liang	709
Design of Collecting and Processing System of GPS Information Based on ARM and Linux D. En, H.H. Wei, N.N. Wei, X.L. Shi and C.S. Zhou	714
Indoor Open Spaces Precious Device Regulatory System Design Based on Internet of Things Z.H. Yu, Y.Q. Jian, S.R. Liu and L.J. Cao	718
The Application of Programmable Controller to Chip Design S.H. Lan and J. Zhang	722
Model Validation Method for Simulation Experiment System of Complex Electromagnetic Environment X.D. Huang, G.X. Shen and K.D. Wang	726
Temperature Control System Design of Rapid Thermal Cycle Injection Moulds with Electric Heating F.L. Huang, J.M. Gu and J.H. Xu	731
An Improved Anti-Collision Algorithm in RFID System H. Sheng, Y.P. Wang, X.B. Zhang and X.L. Wang	736
A Collaborative Drawing Model Based on RMI W.F. Wang and W.H. Wang	741
Anti-Collision Algorithm Analysis of ALOHA-Based RFID Y.P. Wang, H. Sheng, X.L. Wang and X.B. Zhang	745
A Study of the Linear Quadratic Type's Optimal Control over the Micro-Vibration of Coupled-Pendulums with the External Force C.J. Shan, J. Luo, L. Li, N. Xu and Y.Q. Shan	750
A Hardware Design of Fish Tank Intelligent Purification System M. Lin	755
Design of Parameter Adaptive Fuzzy Controller for the Planar Double Inverted Pendulum W. Zhang and J.L. Zhang	759
Hybrid Electric Vehicle Energy Management and Control Based on Battery Energy Balance B. Yan, Y.Q. Hu, T. Yan, P.P. Ma and L. Yang	764
Research on Dynamic Measurement System for Bulk Material Based on Machine Vision P. Li, Y.W. Wang and C. Xu	768

Chapter 9: Methods and Algorithms of Research and Designing

The Application of Artificial Immune System in Mechanical Engineering for Constrained Optimization X.N. Ran	775
Research of Robocop Simulation Platform for Robot Soccer G.Y. Zhong	780
Adaptive Error Concealment Technology Based on H.264 for Digital Satellite Set-Top Boxes X.J. Tao and L. Wang	784
New Compound Method for Target Recognition and Tracking K. Sun	790
Fast 3D Human Face Modeling Method Based on Multiple View 2D Images Y.S. Wang	796
Probabilistic Controlled Teleportation of an Arbitrary Triplet W State Z.Y. Guo, Q.L. He and M.Z. Shang	800

Design and Implementation of Manchester CODEC Based on FPGA Y.H. Zuo, J. Yang and X.Y. Cheng	805
Image Enhancement Based on the Minimum Entropy and Rough Sets L.Y. Tong, H.T. Guo and R.L. Zhang	810
Research on Filtered-XLMS Algorithm Based Adaptive Active Noise Control S. Du and S.L. Lu	815
A Hybrid Optimization Method for Neural Tree Network Model F. Qi, Y.H. Ma and X.Y. Liu	820
A Novel Real-Time Facial Expression Capturing Method Y.S. Wang	826
Bell Waves and Kind Waves for a (1+1)-Dimensional Nonlinear Partial Differential Equation Q.B. Ren, S.H. Ma and J.P. Fang	831
The Study on 4-Link Fish Robot Model Optimization Based on Evolutionary Algorithm H.P. Sun	835
Weighted Cellular Automata Design for Test Pattern Generator Based on Genetic Algorithm E.M. Tan, Q.Q. Li and J.G. Jiang	840
Biomechanical Analysis of Cervical Finite Element Model D.M. Wu, L.T. Zhang and J. Zhao	845