Contents

Section One: Mechanical Engineering and Automation	
Improvement of Lapping Machine Slurry Supplying System Lihui Jin, Yutian Wang, Guorui Wang, Chungeng Yang	1
The SMA Miniature Obstacle-Navigation Mobile Robot System Control Xuepeng Liu, Dongmei Zhao	5
Research on Frequent Flyer Churn Early Warning in Civil Aviation Based on Predictive Value LiFeng Wei, JianWei Ji, BingMei Zhao	9
The Design Analysis Based on Numerical Control Lathe Manipulator Dummy Prototype Engine	15
6-DOF Robot Kinematics Analysis and PTP Motion Control Study Based on Matlab	21
Real-Time Motion Estimation of Mobile Robots Based on Electronic Images	27
Visual Modeling Method and Analysis of Geometric Characteristic for Triangular Helical Structure in Mechanical Engineering	33
Particle Mechanical Vibration Analysis on the Basis of Matlab	41
The Impact of Organizational Slack on the Performance of Mechanical Manufacturing Firms	45



Fault Diagnosis of Electronic Ignition System of Automobile Engine Based on Wavelet Transform	51
ZhiGang Han, XiaoYan Liu, ShuXia Jiang	
Research on the Jet Influence on the Mechanical Launcher of Various Ignition Height	57
Optimization Design for Launch Box Based on the Effect of the Shock Wave	65
ShaoZhen Yu, Yi Jiang, Jia Deng, BoWei Liu, GangLian Zhao	03
Cracked-Shell Detection of Preserved Eggs Based on Acoustic Response and Bayes Theory in Mechanical Engineering	71
The Clustering NIGA for Solving the Nesting Problem in the Hull Construction Automatic Nesting System	79
The Research on Secondary Development of Parametric System of Cylindrical Gear Reducer Based on Pro/E	85
Dual Optical Fiber Temperature Sensor Application in Mechanical Engineering	91
Research on Production Agent Modeling of Ship-Repair Based on MAS Li He, Xuewen Huang, Xiaobing Liu	95
Q Parameterized Stabilizing Controller for Piecewise Linear Systems Zhizheng Wu, Lu Wang	101
Analysis of Piston Pneumatic Motor Work Process	107
The Application of Energy Feedback Device in Port Crane Control System	113
The FEA Contact Analysis of High Pressure Packers	119
Discussion on a Calculating Method for Anti-overlapping Winding Number in Textile Mechanical Engineering	125

Dynamic Modeling and Simulation of Five-Cylinder Forging Machine DaPeng Zhang, BaoHua Cheng, ChangBin Li, AiGuo Wu	131
Genetic Algorithm Combined with Simulation for Job Shop Scheduling Problem in Mechanical Engineering	139
Prediction of Aero-Engine Exhaust Gas Temperature Based on Chaotic Neural Network Model	145
Visual Simulation of the Robot Welding Station of Car-Body-in-White Floor Assembly	151
A Method for Auto-detecting Surface Defections of Ring Pieces Yuhuai Wang, Keyong Hu, Yongqing Chen, Zhouxiang Shou	157
Real-Time Trajectory Tracking of a Wheeled Mobile Robot with Kinematic and Dynamic Constraints	165
Effect of Contact Interface Pressure on Ultrasonic Transducer Li Zhanhui	171
Trajectory Tracking Optimal Control of the Wheeled Mobile Robots Based on Genetic Algorithm Jianhua Li, Jinwen Li	179
A Design of Marine Propulsion Shaft Power Telemetry System	185
An Expert System for Crane Working Condition Selection	191
Mechanism Design of the Inspection Robot for Aircraft Fuel Tank Guochen Niu, Taiwen Li, Li Wang	197
Life Cycle Cost Estimated for the Diesel in Mechanical Engineering Based on the BP Neural Network JiaShan Jin, JunBao Geng, LinKai Sun, GuoWei Chen	203
Development of Intelligent Liquid Inspection System Based on Machine Vision	209
A Branch and Bound Algorithm to Minimize Makespan on Identical Parallel Machines with Consumable Resources	217

Research on Performance of Gas Turbine's Intake	223
A System-Level Compensation Method for Inertial Navigation System Jiwei Zhang, Xiaodong Xu, Bo Wang	229
Optimal PID Controller for Integrating Processes with Time Delay Based on Modified Internal Model Methods	235
Optimal Design of PV/Wind/Battery Systems by Genetic Algorithms Considering the Effect of Charge Regulation	241
Fuzzy Control for Variable-Speed Constant-Frequency Generators Zhiming Yang, Xiaorong Wang	249
Adaptive Fuzzy Controller for Air Conditioning System Lepeng Song, Huanhuan Chen, Huiming Wu, Zhiming Yang	255
Fault Diagnosis of Diesel Engine Based on EMD and TFD	261
Research on the Proposal to Improve the Stability of Crane Rotary Mechanism from Mechanics Stability	267
The Research of Ultrasound Parameters Affecting the Stability of Bio-diesel Fuel for Mechanical Engineering	271
A Real-Time Optimized Trajectory Planning for a Fixed Wing UAV	2 7 7
Irregular Graphics Nesting Algorithm in the Hull Construction Automatic Nesting System	283
Robot Localization Combining Stereo Vision and Artificial Landmark <i>Xiaoming Dong, Benyue Su</i>	289
A New Method for the Inverse Kinematics of 6-DOF Manipulator Based on Dual Quaternion	295
A New Algorithm for Evolutionary Structural Optimization in Mechanical Engineering	303

Contents	XV
Numerical Simulation and Optimization of Centrifugal Fan	311
High-Performance Speed Control of Permanent Magnet Synchronous Motors Using Extended Kalman Filter	317
Fiber Bragg Grating Strain Sensor Applied in Security Monitoring of Road Tunnel Structure	323
Analysis of the Robot Positioning Error Based on Jacobian Matrix Lizhe Qi, Leibin Yu, Wei Wang, Lei Chen, Chao Yun	329
Research on Measurement and Analysis of Load Spectrums Based on Actual Equipment Experiment and Virtual Prototyping	335
The Study of Surface Smooth Finish of Spinneret Hole Bottom Manufactured by Drills of Different Materials	343
Numerical Simulation on the Influence of Altitude on Jet Flow Field BoWei Liu, Yi Jiang, Yang Song, ShaoZhen Yu	349
The Research of Mobile Robot Avoid Obstacle Based on Kalman Filter Forecast Combined with Vector Field Rectangular Algorithm	357
The Floating Crane Gear Fault Classification Model Based on Weighted Kernel Least Squares Support Vector Machines	363
A Novel Lagrangian Support Vector Machine and Application in the Crane Gear Fault Diagnosis System	369
Research on Inverted Pendulum Control Based on LQR	375
Simulation and Optimization of the Hydraulic System of 3000T Automatic Hydraulic Machine	381
Study on the Comparison of Driving Configuration for Hybrid SUVs Sijia Zhou, Jingyan Xia, Jiangqi Long, Pingdan Xu, Jun Chu, Yi Zhang	389
The Five-Axis NC Machining Simulation and Optimization	395

Regulation against Unknown Sinusoidal Signals in an Active Suspension System	403
Zhizheng Wu, Fei Peng	, , ,
A Study on CAD System for Bending Die Based on UG	409
A Modified Satellite Selection Algorithm Based on Satellite Contribution for GDOP in GNSS	415
Parametric Design of Helical Gear Based on UG Erbao Peng, Hongge Zhang	423
Study on Nondestructive Inspection of Pears Quality Based on Mechanical Engineering Method	429
Design of Austenitic Stainless Steel Solution Treatment Device	437
Research on a Novel Thermoelectric Generator Module Made of Bismuth Telluride	443
The Application of Rough Programming Based on Inclusion Degree in Mechanical Engineering	449
Fitting Methodologies of Freeform Curve and Surface Model for Mechanical Parts in Commercial Software	455
Parameter Tuning Research on Digital AC Servo Controller System Erbao Peng, Zhe Wang	461
Section Two: Vehicle Engineering and Technology	
The Cooperative Control of the Vehicle Steering/Anti-lock Braking System Using the Coordination Variables	467
The Nonlinear Decoupling Cooperative Controller of the Steering/Antilock Braking System of the Vehicle	473
The μ Robust Control for the Steering System of the Vehicles	479

A Study on the Compatibility of Sandwiched Tube-Type Airbag in Rhomboid Vehicle	487
Simulation and Optimization of Vehicle Ride Comfort on Random Road Lin Hu, Jing Huang, Fangyi Li	495
Research on Optimal Guidance Law of Autonomous Underwater Vehicle ChangBo Liu, Hao Ding	503
GVMS: A GPS/GSM Based Vehicle Management System for the Army Zhidong Sun, Jiandong Sun	509
Development and Realization of an Amphibious Vehicle Simulator for Driver Skill Training	515
A Novel Bidirectional Onboard Charger for Electric Vehicle	521
Bus Rapid Transit Signal Priority Using Advanced Detection	529
The Maximum Charge and Discharge Power Estimation in Hybrid Electric Vehicle Based on Artificial Neural Network	535
An Experiment System of Near-Minimal Energy-Optimal Trajectory Planning for the Car-Like Vehicle in a Changing Environment Jian Yang, Mi Dong, Yan Tang	543
Obstacle Detection for Unmanned Ground Vehicle in Cross-Country Environment	549
Development of Knowledge-Based System for Bus Body Concept Design Lingxia Kong, Chunning Jin, Qinghong Xu, Guofu Yang, Dongbin Kan	555
Design of Controlling System in Multi-function Durability Testing Device for Vehicle Vacuum Booster with Brake Master Cylinder	563
The Design of an Embedded TCP/IP Protocol Stack of the Vehicle Detector	569
Bin Wu, Hongwen Jia, Wenji Yang, Lanlan Li	
Research on Intelligent Traffic Control System Based on Hybrid Genetic Algorithm	575

XVIII Contents

An Experiment System of Multi-objective Control Design for Autonomous Vehicles	581
A Design of Bike Sharing System Based on GPS	587
Lane Mark Detection Based on Improved Hough Transformation for Vehicle Electronic Technology	593
Object Detection Based on Reinforcement Learning and Gabor Feature for Image Electronic Technology	599
A Strategy to Solve the Local Minima Problem for Autonomous Mechanical Vehicles	605
Application of Neuro-fuzzy Inference in Longitudinal Vehicle Control and Warning Systems	611
Author Index	617