

Table of Contents

Preface and Organizing Committees

Chapter 1: Sustainable Construction Materials Technology

Characterisation of High Calcium Wood Ash for Use as a Constituent in Wood Ash-Silica Fume Ternary Blended Cement C.C. Ban and M. Ramli	3
Properties of Cement Composite Containing Waste Tire Rubber, Silica Fume and Polypropylene Fiber A. Sadrmomtazi and R.Z. Zanoosh	12
The Role of Nano-SiO₂ Addition in the Mechanical Properties of RHA Composite Cement Mortars A. Sadrmomtazi and A. Fasihi	18
Effect of Polypropylene Fiber on Mechanical Properties of Concrete Containing Fly Ash H.W. Wang	26
Effect of Polypropylene Fiber on Strength and Flexural Properties of Concrete Containing Silica Fume H.W. Wang	30
The Influence of Glass Types on the Performance of Air-Conditioned Office Buildings in Australia L. Guan	34
Size Effect of Waste Compact Disc Shred on Properties of Concrete W.C. Tang, Y. Lo and H.Z. Cui	40
The High Quality Technical Research of Road Concrete Recycled Coarse Aggregate M. Mandula, X.Y. Hu, F.J. Chen and W.L. Zhang	47
A Study of Smoke Extraction Strategies in a Side Platform with Screen Door W. Zhong, J.P. Yang, B.A. Pei and J.J. Niu	52
Preliminary Study of the Unsteady Response Spectrum Based on Time-Varying P. Qiang, P. Guan, J. Tian and E.L. Chen	58
Innovative Siloxane Coating Formulations: The Experimental Assessment of the Durability of Colour G. Alaimo, D. Enea and E. Nuccio	63
Safety Accident Analysis and Risk Control in Subsea Tunneling C.P. Zhang, L.M. Li, H.R. Song and D.L. Zhang	69
Dynamic Finite Element Analysis of RCC Gravity Dam X.Y. Zhang, Z. Li and L. Wu	75

Chapter 2: Materials Science in Computer-Aided Manufacturing and Design

Generation of the 3D CAD Model of Construction Building X.Y. Li and Z.G. Zhang	83
Aerodynamic Performance of a Double-H Type Vertical-Axis Wind Turbine: Designed by a Stream-Tube and CFD Method J. Jiang, X.B. Zheng, L. Zhang, Z.C. Li and L. He	90
Research on Complex Product Lifecycle Quality Management Technology Based on 3D Product Model X.L. Jia	96
Study on Accurate Strength Analysis of Blade Wheel in Vehicular Hydraulic Retarder Based on Sequential Coupling Method W. Wei, B. Zou, Q.D. Yan and H.Y. Li	103
An Optimal Construction of a Hydropower Arch Gate K. Cai and C. Zhang	109

An Optimal Process for Ultrasonic Amplitude Transformer Design with FEM G.Y. Liu, Z.N. Guo, Y.B. Li, G. Wang and Z.G. Huang	116
Application of FEM Simulation Technology on Vibration Reliability Analysis of Electronic Components F.F. Song, X.Q. He and Y.F. En	122
Investigation of Process Parameters Based on Kriging in Sheet Metal Forming Y.M. Xie and X.M. Xu	128
Investigation and Simulation on Amorphous Formation and Growth N. Li and W.Z. Chen	136
Digital Oil Depot Designing and the Research of Visual Interactive Technology Y. Gao, J.H. Zhang, W.J. Ji and S.X. Guo	141
Effect of Rare Earth Ce Addition on Microstructure and Properties of WCu Contact Materials X.H. Wang, J.T. Zou, B. Wang and S.H. Liang	148
Effect of Internal Electrical Field on the Electrical Breakdown Properties of Contact Materials J.R. Liu, P. Xiao, X.H. Wang, S.H. Liang and H.Y. Liu	154
Vacuum Arc Motion Characteristics on CuWCr Composites P. Xiao, J.R. Liu, X.H. Wang, S.H. Liang and H.Y. Liu	161
Anti-Control Research on Permanent Magnet Synchronous Motor System Y.L. Liu, J.Y. Liu and G.P. Liu	166
PSO Based Steel Rolling Process Optimization J.J. Yang, J.C. Shi, W. Zhang, L.P. Liang and P.J. Zhao	172
Variable-Grain Optimization Design of High-Speed Transmission Helical Gear F.Q. Zhao, T. Wang, R.L. Zhang, Y.J. Li and J. Shen	179
Design of Computer Simulation Model for the Analysis Of Coupling Effects between Actuators of Hydraulically Driven 6 DOF Parallel Manipulators P.O. Ogbobe, Z.M. Ye, H.Z. Jiang, C.F. Yang and J.W. Han	184
Stability Analysis for the Milling of Lateral Walls A.J. Jiang and K. Wu	190
Design and Analysis on Dynamic Characteristics of Grinding Machine for High-Pressure Vessel of Nuclear Power Z. Huang, Y. Huang, Y. Liu, Y.J. Wang and Y. Zhang	197
Effect Factors Analysis of Flow Noise Generation from Perforated Duct Muffler Element H.J. Zhao and Z.X. Deng	204
Wavelet Grey Moment Vector and Hidden Markov Model Based Fault Diagnosis for Ball Bearing J.P. Xuan, Z.B. Xu, B. Wu and T.L. Shi	210
Study and Application of Virtual Remanufacturing S. Zhu, J.K. Yao and P.Z. Cui	216
A Three-Dimensional Model of Droplet Impinging, Solidification and Suspension on the Substrate S. Zhu, F.L. Yin, J. Liu and Y.Y. Liang	222
A Data Driven Modeling and Simulation Methodology for Automotive Assembly Plant N. Wang, S.Q. Li and J.F. Wang	228
Modal Analysis of High Power Variable Speed Hydrodynamic Coupling Impellers R. Zhang, W.X. Ma and X.Q. Lu	236
A Novel 2 DOF Haptic Device for Gunnery Training M.Y. Zhou, G.Y. Liu and K.K. Lu	241
Study of the Problems Related to Dynamic Measurement of Axial Force of Water Pump X.S. Che, Y.F. Gao, H. Xu and F.Y. Che	247
Dynamic Information Acquisition and Processing Technology of Pump Axial Force X.S. Che, X.H. Wang, Y.F. Gao and H. Xu	253
A Torus Patch Approximation Approach for Point Projection on Implicit Surfaces X.M. Liu, L. Yang, Q. Hu and J.H. Yong	259
Optimization Algorithm for Task Allocation with Multi-Objectives in Collaborative Manufacturing Project X.J. Wu and J.Z. Cao	266

Structural Feature-Based Model Templates Design for Ultra-Precision Positioning System W.C. Jia, X. Luo, F. Yuan, L. Zhou and W. Jiang	272
The Platform Architecture of Digital Design and Manufacture for Printing and Die-Cutting Machinery of Corrugated Board Based on MAS H.B. Pu, W.G. Li and Q.Q. Liu	280
Fast Automatic Matching Method on Multi-View Point Clouds for Rail Tanker T. Fu, W.J. Liu and J.B. Zhao	287
Research on Aero Engine Blade Information Model Based on Manufacturability Evaluation Q.M. Fan, Y. Cao and H.J. Liu	294
Research on Product Design of Solitary Elder Y.Q. Wang, B.C. Zhang and W.M. Guo	301
Research on the Relation of Brands Image to Product Form Y.Q. Wang, B.C. Zhang and W.M. Guo	306
Collision Detection of Building Facility Pipes and Ducts Based on BIM Technology N. Han, Z.F. Yue and Y.F. Lu	312
Numerical Simulation of Blade-Wake Interaction of Vertical Axis Tidal Turbine Z.C. Li, Q.H. Sheng, L. Zhang, Z.M. Cong and J. Jiang	318
A New Algorithm for Calculating the Degrees of Freedom of Complex Mechanisms W. Jiang, X. Luo, W.C. Jia, Y.T. Hu and H.P. Hu	324
Roll Vibration Analysis of Planar Aerostatic Bearings through a Distributed Spring Model W. Jiang, W.C. Jia, S.S. Liu, Y.T. Hu and H.P. Hu	332
Research of Marine Diesel Engine's State Prediction Based on Evolutionary Neural Network and Spectrometric Analysis H.J. Wei and G.Y. Wang	339
A Component-Based Meta Modeling Framework for Complex Product Virtual Prototype T. Li, T.Y. Lin, X.D. Chai and B.C. Hou	346
Parametric Optimization Design on Mine Carrier Robot J. Wei and H.W. Ma	353
Kinetic Characteristics Analysis and Simulation Research on Carrier Robot J. Wei and H.W. Ma	359
Performance Simulation Analysis and Design of the Scale Model for the Earth Pressure Balance Shield X. Chen, Z.F. Shao, X.Q. Tang and P.F. Feng	364
Embodying of Human-Centered Perspective in Household Basic Appliances Product Design T.L. Guo, J. Liu, H.J. Dai and H.X. Zhang	372
Finite Element Analysis and Optimization of Long-Span Gantry NC Machining Center Structure S.B. Xu, Y. Xi, C.N. Jing and K.K. Sun	379
Filling Quality of Ammunition Production and Jet Motion in Defective Filling S.R. Dong and G.G. Chen	385
Virtual Shaping Design of Battery Car in the Golf Q.L. Du and X.C. Cheng	391
Parameterized Modeling of Parts Based on SolidWorks X.T. Yan	394
Numerical Simulation of Erosion and Particle Motion of Multi-Medium Oil-Coal-Water Slurry Pump Q. Zhang, Q.S. Song and J. Mao	398
Load Spectrum Test and Numerical Simulation on the Rolling Rack for Dynamic Design and Control W. Zhao and D. Huang	405
Scheduling Flexible Manufacturing Systems with Petri Nets Based on the Cell Enumeration Method S.S. Gu	412
Scheme Comparison on Unsymmetrical Loading Tunnel Location near Tunnel Portal S.Q. Yu, X.D. Cheng and P.J. Qin	419
Parametric Optimization for a Tapered Deployable Mast in an Integrated Design Environment Z.Q. Deng, Y. Zhang, H.L. Huang and B. Li	426

Coupled Dynamic Analysis of a Spar Type Floating Wind Turbine L. Zhang, H.T. Wu, X.R. Ye and F.M. Jing	433
A Parametric CNC Programming Method for Rapid Battlefield ManufacturingF Z.J. Zhang, S.H. Zhang, J.C. Zhang, X. Jin and B.B. Liu	440
Rigid-Flexible Coupling Model and Dynamic Analysis of Rocket Sled J.H. Zhang and S.S. Jiang	447
Knowledge Based Collaborative Modeling and Simulation Platform to Design Complex Product D.K. Shen and Z.B. Yan	455
Topology Optimization on the Material Distribution of Track Segment for Heavy Machinery Y. Li, G.Q. Wang and Z.H. Yan	460
Protective Performance of the Operator's Helmet for Wheel Loader in the Rollover Accident J.D. Si, G.Q. Wang, Y.S. Zhang and W.J. Hao	471
Numerical Simulation on Aerodynamic Characteristics of Heavy-Duty Commercial Vehicle Z. Zhang, Y.C. Zhang, J. Li and J. Wang	477
Load Spectrum Compiling and Practical Application of Output Flange for Wheel Loader Gearbox Y.S. Zhang, G.Q. Wang and J.X. Wang	483

Chapter 3: Advanced Test and Measurement

Research of Ultrasonic Detection for Bonding Quality of Thin Plate Based on Fuzzy Pattern Recognition X.J. Wang, Z. Zhang and H.T. Wang	493
Experiment and Test Signal Analysis Based on Speed Fluctuation of Torsional Vibration of Large-Scale Rotary Machinery W. Zhao and D. Huang	501
Theoretical and Experimental Study on the Wave Propagation through a Micro Gap X.Y. Chen, G.L. Yu, W.W. Cao and W.T. Qiang	508
Research on Testing Method of Dynamic Characteristic for MEMS-Gyroscope N. Zhang, Y.F. Ren and S.K. Li	515
Signal Decomposition for Three-Axis Gyroscope H.W. Wang, C.J. Qi, Q.X. Wu, Q.M. Surong and Z.H. Xing	521
The Life Prediction System Design of He-Ne Gas Laser W.L. Cao, B. Chen and Y.Y. He	527
Designing of Velocity Measuring System of Initiating Explosive Devices Based on Photoelectric Method S.M. Li, J. Wang and L. Yang	533
The Piezoelectric Constant Testing System Based on the Principle of Laser Scanning Fabry-Perot Interferometer Y. Tong, Z.R. Xia, J.G. Ma and X.Y. Lu	539
Study on Practical FBG Acceleration System W.G. Zhang and J. Zhang	546
The Design for WR-06 Corrugated Conical Horn Antenna and its Application in Emissivity Measurement of Microwave Radiator C.Y. Cheng, F. Li, C.B. Wu and W. He	551
Structural Optimization and Lightweight Design of PET Bottle Based on ABAQUS Q.C. Hu, W.J. Sha, Y.H. Li and Y.S. Wang	558
Thermal Analysis of a Hot Runner System in Injection Mold Q.C. Hu, L.M. Wang, M.Z. Tang and Y.S. Wang	564
Research on Mechanism of the Displacement Error of Reverse Positioning and Clamping for Rotary Table X.G. Jiang, B.Y. Liu and H. Yang	572
Research on the Parameter Measurement Methods of Digital Channelized Reconnaissance Receiver H.Q. Jiang, M.G. Gao, G.H. Sun and P.Z. Tang	578

Tolerance Optimization Design Based on Physical Programming Methods and PSO Algorithm	
H.B. Qiu, Y.Y. Dong, Y. Wang and L. Gao	584
A Study on Measurement Uncertainty of a Vortex Flow Meter in Discrete Liquid Phase	
Y.F. Jia and D.R. Kong	593
Research on Screw Thread Vision Measurement	
J.F. Jiang, Z.X. Jiang, Q.C. Zhang, G.Z. Chai and C.D. Lu	600
Research of Pelvimetry Based on Electromagnetic Tracker	
Y.S. Lu, W.B. Wang and Y.X. Huang	607
Infrared Small Target Detection under Complex Background	
G.H. Peng, H. Chen and Q. Wu	615
Error Analysis of Absolute Interferometric Testing Based on Reconstruction of Rotational Shear	
X. Jia and T.W. Xing	620
Experimental Modal Analysis of Car's Body-in-White	
H. Li, S.B. Fu and B.C. Wen	627
Identification of the Vehicle Noise Source by Sound Intensity Method	
H. Li, Q.R. Zhao and B.C. Wen	634
Numerical Investigations of Ultrasonic Scattering from Voids in Composite Materials Based on Random Void Model	
L. Lin, X. Zhang, J. Chen and X.M. Li	639
Backlash Compensation on CNC Machine Tool Based on Semi-Closed Loop Control	
B. Feng, X.S. Mei, L. Guo, D.S. Zhang and Y.L. Cheng	644
Visual Servo Control for Wheeled Robot Trajectory Tracking	
G.Y. Xu, X.Y. Jia, H. Shi and J.G. Cui	650
Application of Micro-PIV on the Microscale Flow and a Modified System Based on Ordinary 2-D PIV	
B. Yang, Y. Wang and W.B. He	657
The Transverse Motion Trajectories Acquisition of the Aeolian Saltation Sand near the Flat Bed Surface by High-Speed Digital Photography	
B. Yang, Y. Wang and Y. Zhang	664
A Simultaneous Phase Shift Interferometry Used to Pulse Laser Pump-Probe Approach	
H.Y. Song, X.P. He, S.B. Liu and T. Chen	670
The Study of Effects Caused by Job Satisfaction on Performance Evaluation of Professional Coaches in China	
L. Lin	675
Error Sensing Strategy for Active Structural Acoustic Control Based on Acoustic Radiation Modes	
J.W. Wu and F. Tan	682
Wavelet Analysis on Nonstationary Random Road Irregularities	
Z.G. Hu, L.P. Chen, Y.L. Zhang, S.Y. Song and W.F. Guo	689
Gyro Drift Calibration Method Based on Free Double-Position Ground Self-Alignment for SIMS	
J.L. Li, J.C. Fang, M.Y. Zhong and B.Q. Liu	696
A New Algorithm for Spectral Drift Calculation in a Gamma-Ray Spectrometer	
Z.J. Qin, L.Q. Ge, Q.F. Wu and J.P. Cheng	705
A Fusion Navigation of Double Laser Radar for Intelligent Vehicle	
L.X. Meng, F.C. Sun, H.P. Liu and T. Chu	711
Design and Realization of the Dynamic Magnetic Measurement System for Soft Magnetic Material	
L. Zheng, Z.H. Ying, W.P. Kong, F. Sun, W.W. Hu, J.M. Xu and H.B. Qin	719
Test System for Pressure Pulsation in Centrifugal Pump Based on Virtual Instrument Technology	
Y. Luo, Y. Tang, S.Q. Yuan and H. Wang	724
An Efficient Image-Based Method for Detection of Fastener on Railway	
J.F. Yang, M.H. Liu, H. Zhao and W. Tao	731
Low-Cost Fastener Inspection System on High-Speed Railway	
H.B. Zhang, J.F. Yang, H. Zhao, M.H. Liu and W. Tao	738

Synthesis and Characterization of Strong Polar Macroporous Resin Made from Cellulose X. Qi	743
Use the Combination Finite Element Method to Solve the Crack Cylinder of the Torsion Problem X.Y. Tang	751
Application of Wavelet Analysis in Transient Electromagnetic Sounding J. Tang	757
Simulation for Microwave Nondestructive Detection of Thickness and Delamination in Layered-Dielectric in Metallic Substrate Y.É. Yang, C.F. He and B. Wu	764
Analysis of the Difference between Static and Dynamic Performance of Copper Cylinder Pressure Measurement and the Correcting Method D.R. Kong	772
The Performance Test for Trigger Switch of Underwater Plasma Acoustic Source H. Huang, K.Z. Lei, J.G. Huang, L.L. Zhang and J.K. Qu	780
Analysis of Stress Measuring and Testing of Continuous Rigid Frame Bridge Y.X. Yang	787
Numerical Study on Performance Parameter of Pulsed Liquid Jet Pump L.H. Wang, Y. Wu, P.H. Ning and C. Gan	793
2-Dimensional Hologram Based Fault Detection of Rotor T.F. Ming and X.H. Zhang	797
Research on the Performance Detecting System of High-Precision Small-Scale Solid Rocket Motor Q. Cao, X.P. Feng, J. Li and T. Dong	804
The Measurement of Three-Dimensional Road Roughness Based on Laser Triangulation X.Q. Li, Z.X. Lu, L.Y. Zhao, Z.H. Li, B. Guo and X.F. Bai	812
Design on Hierarchical Testing System for Unmanned Ground Vehicles X. Li, G.M. Xiong, Y. Sun, S.B. Wu, J.W. Gong, H.Y. Chen and L. Gao	817
Optimization Design of Turbine Flow Sensor in Hydrovalve Y.X. Shi	823
Precision Calculation Algorithm and Error Analysis of Zoom Magnification Measurement Z.D. Zeng, C.K. Sun, Y.Z. Zheng, M.D. Yan and S.K. Ng	828
Research on a Co-Vibrating Vector Hydrophone with Central Fixed Structure P. Wang and Y.Q. Du	835
A Combined Measurement Method with PIV and Schlieren Technology on under Expanded Supersonic Jet G.L. Jiang, M. Wen, J.F. Ye and W.T. Wu	842
Application of Multi-Baseline Digital Close-Range Photogrammetry Technique in 3D Reconstruction of Underground Tomb X. Wu, W. Feng and K. Wang	847
Irreducible Water Saturation Measurement of Volcanic Rocks Using Nuclear Magnetic Resonance Y. Zhou, H.K. Guo and G.Q. Wei	852
Testing and Modeling of Vehicular Hydraulic Braking System with Linear Solenoid Valves H.H. Jing, Z.Y. Liu and H. Chen	858
Ultraviolet Spectroscopy Method for Classifying Vinegars H.D. Xie, L.J. Bu, X.W. Peng and Z.X. Li	865
Load's Damping Swing by Trolley's Driving Force Control for Overhead or Gantry Crane B. Zhong and R.J. Zhan	875
Ultrasound Wireless System for Sensor Data Transmission of Ultra-Thickness Plank Y.J. Feng and S.J. Wang	882
The Electric-Hydraulic Servo Equipment for the Real Force and Motion Simulation of Pumping Unit Y.J. Feng, M. Hong and X.W. Huo	889