## **Table of Contents**

## **Preface and Organizing Committees**

## Chapter 1: Materials Science, Processing, Technology and Engineering

New Mortar for Clay Masonry Structures F. Gouny, F. Fouchal, P. Maillard and S. Rossignol	3
Quantitative Determination of Arsenate in Dried Shrimp by Spectrophotometric Measurement of its Heteropoly Blue C. Suitcharit	9
Inverse Problem with Integral Overdetermination for System of Equations of Kelvin-Voight Fluids K. Khonatbek	15
Effect of Strain Rate on Mechanical Properties of Pure Iron W.P. Bao, Z.P. Xiong, X.P. Ren and F.M. Wang	21
Determining of Corrosion Resistance of Alloyed Earth Plateproduced by New Electro Deposition Method M. Karimian, S. Shojaian and A. Golkar	26
Analytical Solutions Using a Higher-Order Refined Theory for the Static Analysis of Functionally Graded Material Plates	
K. Swaminathan and D.T. Naveenkumar  Digital Studying of Surface Groove on the Pipe Hydroforming Process in Cross Shaped  Joint Production	30
M. Kahrizi  Cross Shaped Hydroforming Process Comparing of Finite Element Methodand Practical	36
Works M. Kahrizi	41
Iron Oxide Materials for Positive Electrodes of Lithium and Lithium-Ion Batteries A. Klenushkin, B. Medvedev, Y. Kabirov and M. Evdokimov	46
Dielectric Spectrum of CaCu <sub>3</sub> Ti <sub>4</sub> 0 <sub>12</sub> from the Giant Permittivity to its Negative Values Y. Kabirov, V. Gavrilyachenko, E. Panchenko, E. Milov and A. Klenushkin	52
Biomolecule-Assisted Synthesis of CoS Microclusters with Well-Aligned Nanoflakes M. Wang, Z.Q. Wang, Y.C. Chen and Y.L. Min	56
Fabrication of Nanoporous Copper Electrodes for Electrocatalytic Oxidation of Methanol W. Zhang, L.J. Li, G. Jia, J. Li, Z.Z. Cao, H. Wang, C.H. Li, Y.C. Liu, Y.F. Gao and J.R. Liu	60
Magneto-Elastic and Mechanical Properties of Fe <sub>81-x</sub> Ni <sub>x</sub> Ga <sub>19</sub> /Si(100) and Fe <sub>81-y</sub> Ni <sub>y</sub> Ga <sub>19</sub> /Glass Films S.U. Jen, C.C. Liu and C.Y. Chuang	66
Quantitative Analysis of Overlapping X-Ray Fluorescence Spectra for Ni, Cu, Zn in Soil by Orthogonal Signal Correction and Partial Least Squares Algorithm	
W. Zhang, Y.J. Zhang, D. Chen, R. Zhang, X.Y. Yu, Y.W. Gao, C.L. Wang, J. Liu, N.J. Zhao and W.Q. Liu	70
Time-Dependent Behavior of High Performance Fiber-Reinforced Concrete A. Sprince, A. Korjakins and L. Pakrastinsh	75
<b>Photothermal Response in Semiconducting Microcantilevers Produced by Laser Excitation</b> Y.Q. Song and X.G. Yang	81
Interfacial Crack Effect on Thermal Mechanical Behavior of Solder Bump for Flip-Chip Package: A Numerical Analysis Y.P. Mu, W.G. Jiang and H.P. Zhao	85
Dynamic Analysis of Steel and Dural Drill Rods L. Khajiyeva, A. Sergaliyev and A. Umbetkulova	91
Phase Transition Study of CaB <sub>6</sub> under High Pressure J. Wang, G. Peng and B.J. Wu	97
Thermal Degradation of Epoxy Resins Containing Copper Compounds Q.J. Dai and M. Gao	101

Thermal Degradation of Hemp Treated with Guanidine Carbonate Q.J. Dai and M. Gao	106
Numerical Simulation of Small-Scale Explosion in Dry Sand Y.Q. Ding, W.H. Tang, X.W. Ran and X. Xu	110
Synthesis of PMMA-b-PS Block Copolymer by Emulsion ATRP and its Self-Assembly Property	
B.Y. Tian, E.J. Tang, M. Yuan, R.X. Hao, C.M. Li, F. Bian and L. Li	115
Fabrication, Characteristics and Application in Dye-Sensitized Solar Cell of Vertically Alligned ZnO Nanorod Arrays Guided with Polyethyleneimine via Hydrothermal Method M. Saleem, L. Fang, F. Wu, L.W. Jun, C.L. Xu and S.J. Xue	120
Nanostructured Graphenes and Metal Oxides for Fuel Cell and Battery Applications Z.F. Li, J. Xie, L. Stanciu and Y. Ren	126
Interfacial Behaviors of Vacuum Brazed Joint between Diamond Grit and Ni-13Sn-28Cr Filler Alloy	122
J.O. Ham, J.H. Chung, S.K. Jung, Y.M. Byoun and C.H. Lee	132
Formation of Polymer Brushes with Diblock Copolymers on a Planar Surface Y. Yang, C.C. Zuo, Y.X. Zuo and Y. Yu	143
Molecular Dynamics Simulation on Dynamic Properties of Bubble C. Qiu and H.C. Zhang	150
<b>Experimental Study of Gas Humidity on the Dielectric Barrier Discharge Influence</b> Y.H. Liang and G.J. Cheng	157
<b>Tanjung Bin Coal Bottom Ash: From Waste to Concrete Material</b> A.U. Abubakar and K.S. Baharudin	163
Characristics of Shape Memory Composites Combined with Shape Memory Alloy and Shape Memory Polymer	
X. Feng, L.M. Zhao and X.J. Mi	169
An Eigenexpansion Method in 2D Viscoelastic Materials L. Chen and F. Yuan	173
Metal Flow Velocity in an Intake Port in the Process of Die Casting S. Gaspar and J. Pasko	177
Integrative Analysis of the Injection Molding Process and Mechanical Behavior of Plastic Part Q.W. Zhang, Y.J. Xu, W.H. Zhang and J. Wang	181
Effect of Galla chinensis on the Wear Resistance of Dentine	101
H. Li, M. Deng, S.C. Peng and J.H. Shi	187
Kinetics and Distribution Clusters of Damage in Loaded Materials: Simulation with Probabilistic Cellular Automaton G.A. Kazunina and D.V. Alekseev	191
Characteristics of Electrochemical Machining Passive Films on Stainless Steel S304 Z.F. Wei, X.H. Zheng and N. Ma	197
Experiment Study of Pulse Electrochemical Finishing of GCr15 Bearing Steel X.H. Zheng, Z.F. Wei and S. Huang	203
Stress Intensity Factors and Weight Function for Internal Surface Faults in Cylindrical	
Vessels Y.L. Ni, S.T. Yang and C.Q. Li	209
Mechanical Properties Analysis on Honeycomb Sandwich Structure Considering Flexural Rigidity of Face Sheets	
X.X. He, Y. Liao and X.J. Liang	216
<b>Study of Solidus Velocity on Porosity Formation in A201 Aluminum Alloy Castings</b> Y.S. Kuo	223
The Experimental and Numerical Investigation on the Mechanical Properties of Metallic Foil	
H.M. Zhang, X.H. Dong, Q. Wang and F. Peng	228

## **Chapter 2: MEMS and Mechatronics, Image Processing and Applications**

Using the Theory of Spline Function to Implement the Optimal Dispatch for Mechanical Arm	
S.J. Ma Thermoelectic Demning in Lemineted Composite Circular Microplete Personators	237
Thermoelastic Damping in Laminated Composite Circular Microplate Resonators W.L. Zuo, X.D. Liu and P. Li	241
<b>Analytic Model and FEM Characterization of Two Piezoresistive Microphone Membrane</b> P. Luca and O. Per	248
Research on a Wavelet Filtering Method of the Fiber Optic Gyroscope Based on EMD B. Zhou and W. Wang	253
Design Optimization of MEMS Based LLC Tunable Resonant Converter for Power Supplies on Chip	
F. Khan, Y. Zhu, J.W. Lu and D. Dao	258
A Novel Bidirectional Z-Shaped Thermally Actuated RF MEMS Switch for Multiple-Beam Antenna Array J. Pal, Y. Zhu, J.W. Lu and D.V. Dao	264
Microfabrication and Characterization of Stack Coupled Inductor Coils for Magnetic Sensors and Actuators	
J. Yunas, Y.M. Burhanuddin and E.P. Roer	270
Comparative Study of Top Electrode and Bottom Electrode Sensing Resistor Schemes for MEMs Based Bolometer Application  LE Fong V. V. Kong C. Vyon O. V. Zyo S. M. Chen and V. H. Zhao	275
J.F. Feng, X.X. Kang, C. Yuan, Q.Y. Zuo, S.M. Chen and Y.H. Zhao  Design and Study of Magnetization Characteristics of a Magnetostrictive (Tb <sub>0.3</sub> Dy <sub>0.7</sub> Fe <sub>1.95</sub> )	275
Actuator under Zero Pre-Stress Conditions for Direct Current Input R. Joshi and R. Kadoli	281
<b>MEMS Accelerometer Design Optimization Using Genetic Algorithm</b> V.S. Krushnasamy and A.V. Juliet	288
Perspective of Parallel Simulation in Mechatronic Systems - Metal Cutting R. Dubovská, P. Kvasnica and I. Kvasnica	295
<b>Design and Verification of a "Soft" eFPGA Using New Method</b> X.D. Xie, P. Li and W. Li	301
<b>Designing and Performance Assessment for Sensor Color Interpolation</b> G.G. Jeon	307
A Research on X-Trans Patterned CMOS G.G. Jeon	313
Efficient Color Configurations for Sensors G.G. Jeon	319
A Soft Decision Making Model for Detail Preservation G.G. Jeon	323
Optimal Bit Plane Arrangement for Image Size-Performance Tradeoff G.G. Jeon	327
Electromechanical Properties of Vertically Aligned Carbon Nanotube A. Rashidi, M. Omidi, M. Choolaei, M. Nazarzadeh, A. Yadegari, F. Haghierosadat, F. Oroojalian and M. Azhdari	332
Clustering in Wireless Sensor Networks: Performance Comparison of EAMMH and LEACH Protocols Using MATLAB	225
M.R. Mundada, N. Thimmegowda, T. Bhuvaneswari and V. Cyrilraj	337
<b>Embedded System for Detection, Recognition and Classification of Traffic Signs</b> D.V. Correia and P.D. Gaspar	343
<b>Design and Research of Low-Energy Consumption Sensor Nodes in a Smart-Scene System</b> C.X. Fan, R. Li, J.W. Zou and Y.Q. Wang	352
<b>Design and Manufacture of Ultra-Small Chip Power Inductor</b> C.X. Chen and Y.H. Mao	359
<b>Experimental Investigations upon the Electrical Resistance of Microcontacts</b> M. Glovnea and C. Suciu	365
The Study on Disturbing Force of Dynamic Mechanical Systems Using Kalman Filter Techniques	271
Z. Jing	371

Fault Current Limiter Based on Series Voltage Source Inverter H. Li, D.M. Han and L.Q. Zeng	378
Investigation of Dynamical Peculiarities of Manipulator on the Basis of close Circuit	
Mechanism K.A. Tuleshov, A.K. Ozhikenov and K.A. Ozhiken	386
Chapter 3: Design, Modelling in Manufacture and Manufacturing Technologies	
A New Approach for Modeling Electro-Osmotic Flow Micro-Cooling Systems A. Taklifi and A. Aliabadi	393
Design of a Total Monitoring System for Air Drilling Process H. Jiang, H.X. Wang, W.J. Lan and J. Zhang	400
Numerical Study of the Effect of Propellers Skew on Cavitation Performance Z.F. Zhu	405
Finite Element Analysis of Rubber Sealing Ring Resilience Behavior J. Qu, G. Chen and Y.W. Yang	410
<b>Determination of Attack Angle and Tilt Angle of a Cutting Pick</b> Y. Sun and X.S. Li	415
Methodology for Determining the Propagation Speed of the Hydraulic Shock in the Pipes L. Topliceanu, A.S. Ghenadi and L. Bibire	419
Modeling and Analysis of Size Effects on Pure Copper Mechanical Behaviors in Micro Scale Plastic Deformation Processes Q. Wang, X.H. Dong, H.M. Zhang and F. Peng	424
Shape Optimization of 3D Mechanical Systems Using Metamodels A. Janushevskis, A. Melnikovs and A. Boyko	429
Numerical Simulation of Dust Dispersion in 5 L Vessel J.C. Chen, Q. Zhang and Q.J. Ma	436
An Approach to Determine the Maximum Rate of Pressure Rise for Dust EXPLOSIONA Q.J. Ma, Q. Zhang and J.C. Chen	442
Process Design of Composite Concrete for CNC Machine Tool Bed J.M. Ding, G.F. Zhou, H. Cheng and X. Li	448
Green Redesign of CKA6150 Numerical Control Lathe J.M. Ding, C.C. Zhang and Y. Liu	454
Large Deflection Analysis of Non-Hinged Arch J.W. Zhang, S.W. Liu, H.M. Liu, T.B. Liu and J.C. Zhao	459
Insight in the Performance of Scramjet Combustor Based on Orthogonal Experimental Design	
W.Q. Cheng, J.Y. Liu and R. Shrestha  Payalanment Trends and Future Prespects of Cut to Length Machinery	463
Pevelopment Trends and Future Prospects of Cut-to-Length Machinery Y. Gerasimov, A. Sokolov and V. Syunev	468
Inversion Algorithm Based on the Unscented Kalman Filter for Inverse Heat Conduction Problems P. Chu	474
Study on the Key Technology for Large-Scale High-Performance CNC Vertical Broaching	4/4
Machine G.J. Chen, J. Ni, T.T. Liu, M. Xu and L.G. Lin	483
<b>Design, Construction and Evaluation of a Smart Agricultural Harvester</b> M.N.A. Ghani, R.M. Hudzari, F.I.A. Wahab, M.R.H. Ramli and A.W.M. Azhar	487
Engineering Technological in Agriculture Research and Education R.M. Hudzari, M.M. Noorman, M.N.N. Asimi, M.A.M. Atar and M. Nashriyah	493
Further Discussion on Population Growth Models by Stochastic Differential Equations F. Yang, L.D. Zhang and J.F. Shen	499
Research on Inertia Projecting Devices to Eject Water Column for Hydraulic Impact Tests X.J. Liu, X.L. Wang, S.Z. Li, W.Z. Zhong and B.Q. Zhou	504

on the Two-Dimensional Fuzzy Controller	
C.F. Li, K.M. Li and X. Zhang	509
Analysis and Computation of Taper Leaf Spring Based on FE Contact Analysis S.T. Zhou, H.W. Huang, L.G. Ouyang and T.M. Xiang	516
<b>Modified Differential Evolution for Tension/Compression String Design Problem</b> L. Jian, C.J. Yin, S. Hirokawa and Y. Tabata	523
Research on Control of Heat Flux Environment Simulation for High-Speed Aircraft D.F. Wu, Y.W. Wang, S. Wu, J.L. Yang and Z.T. Gao	528
Virtual Health Monitoring System for Wing Structure F.Y. Wan and Z. Qin	534
Rigid Body Motion Conversion due to Collision S. Polukoshko	540
Optimal Control of the Rotor System Motion I. Toleukhan	546
Parameters and Applications of Noise-Gates Y. Jin	553
Chapter 4: AI in Design Engineering, Information Technologies Applications	
Research on the Mean Shift Target Tracking and Recognition Technology Based on Multi- Feature Fusion	561
Y.J. Peng, F. Tan and J. Sun	561
A Now Method of Time Sovies Biogenies Linear Bennesentation	565
A New Method of Time Series Piecewise Linear Representation Q. Wang  Pulse Francisco Control Machanism of V. Para Machine	569
Pulse Exposure Timing Control Mechanism of X-Ray Machine H. Xiao and J.H. Cheng	574
Detection of the Network Intrusion under IPV6 Y. Shen and W.H. Zhu	579
The Real-Time Interactive Smart Energy System Based on the Internet of Things and Cloud Computing	E0.4
L. Chen, Y. Wang, S.W. Yang, X.P. Gu and Y. Xu	584
A New Type of Function Projective Synchronization of Nonautonomous Chaotic System X.S. Zhao, Z.B. Li and F.F. Liu	590
The Geomagnetic Chart's Drawing Based on Normal Kriging Method X.J. Zhang, C. Kang, Y.C. Zhao, Y.Y. Liu, L.M. Fan and Y. Lei	596
Placement Optimization of Smart Piezoelectric Rods for Shape Control of Large Cable- Network Antenna Structures W. Liu and D.X. Li	602
Analytic Solution for Microscale Poiseuille Flow Based on Super-Burnett Equations C.Q. Song, X.Y. Yin and F.H. Qin	609
Research on Siemens PLC Pulse Control L.X. Wang, Z.R. Feng and R.Y. Zhang	616
The Realization of the Source Address Validation Improvement (SAVI) in IPV6 Campus Network	(21
Y.F. Lou and Z.J. Yuan	621
A Design Scheme of Operating System to Run Windows' Application Programs on Linux Platform Y.J. Wang	627
A Floorplanning Algorithm with Minimum Total Length Wires H.Y. Yang and H.A. Zhao	630