

Table of Contents

Preface, Committees and Sponsors

Chapter 1: Materials Science

The Assessment of Material Characteristic Using Vibration Signal Analysis during Drilling Process

O. Inayatullah, F. Hamid, H.W. Hon, N. Jamaludin and S. Abdullah 3

3D MC Simulation of Grain Growth Kinetics and the Zener Limit in Polycrystals

K.R. Phaneesh, A. Bhat, G. Mukherjee and K.T. Kashyap 8

Characterization and Corrosion Behavior of Multilayer [TiN/TiCN]_n Growth on AISI 316LVM Steel

W. Aperador, M.P. Torres and E. Ruiz 13

A Method of Fabricating T Shape Nanochannel on Silicon Substrate

Z.C. Lin, H.Y. Jheng and H.Y. Ding 18

Experimental and Numerical Study on Surface Damage of Dual-Phase Steel Sheet during Stamping

Z.Q. Yu, L. Sun and J. Gao 23

A Study of TMF Characteristics of Ni-Base Superalloy IN738LC

D.K. Lee, J.M. Lee, J.M. Koo, C.S. Seok and J.W. Kim 28

The Viability of Composite Membrane in Treating Produced Water from Oil and Gas Field in Malaysia

M.Z. Shahrudin, A. Adnan, T.A. Tengku Mohd, N.H. Alias and N.A. Ghazali 33

Iterative Taguchi Analysis: Optimizing the Grain Boundary Carbide in Hadfield Steel

S. Hosseini and M.B. Limoei 38

Optimization of Heat Treatment in Manganese Steel by Taguchi Method

M.B. Limoei and S. Hosseini 43

Effects of Continue Compressing Deformation on Texture of AZ31 Magnesium Alloy

G. Wan and B.L. Wu 47

Oxidation Behavior of Fe-15Cu-10Al Ternary Alloys at 700°C

J.H. Xiang, X.C. Xu and W. Wang 51

Summary of the Application of Vanadium

Q.Q. Yang, Y.W. Fang, Y.W. Mu, S.H. Zhang, Y.S. Zhao, Y.G. Li, J.T. Liu and Z.J. Wu 55

Summary of Progress in Extracting Vanadium

Y.W. Mu, S.H. Zhang, Y.S. Zhao, Q.Q. Yang, Y.W. Fang, Y.G. Li, J.T. Liu and Z.J. Wu 60

Effect of Functional Groups on Interfacial Adhesion Properties of PEEK/Carbon Fiber Composites

U. Yapiçi, L. Pan, F. Xu and J.M. Cao 66

Experimental Investigations to Evaluate the Mechanical Properties and Behavior of Raw and Alkali Treated King's Crown (Calotropis Gigantea) Fiber to be Employed for Fabricating Fiber Composite

K. Velusamy, P. Navaneethakrishnan, V.S. Arungalai and K.K. Saravana 73

Tunable Nanostructures and Sers Activities of Sputtered Thin Silver Films

C.Y. Yin, L.N. Xu and N. Gu 78

Synthesis of Semi-Aromatic Copolyester with High Molecular Weight

J.W. Wang, H.J. Xu, X.M. Bai, F. Hong, Y.P. Wang and Y.M. Wang 82

The Pyrolysis Behavior of Alkali Lignin Oxygenized by Hydrogen Peroxide in Ionic Liquid 1-Butyl-3-Methylimidazolium Chloride ([BMIm]Cl)

Z.L. Yang, M.Q. Chen, Z.Y. Luan and W.T. Zhang 86

Effect of Carburizing Atmosphere Proportion on Low Temperature Plasma Carburizing of Austenitic Stainless Steel

X.S. Tong, T. Zhang and W. Ye 90

Effect of Laser Power on Microstructure and Properties of CBN Coating by Laser Cladding on TC11 Titanium Alloy

J. Gao, D.Y. Song and J.W. Feng 94

Effects of Texture on the Fracture Mechanism of AZ31 Magnesium Alloy under Dynamic Impact	
G. Wan and B.L. Wu	98
Dynamic Mechanical Property Anisotropy of ZA31 Alloy by Equal Channel Angular Pressing	
G. Wan and B.L. Wu	102

Chapter 2: Applied Mechanics, Mechanical Engineering and Processing Technologies

Orthosis for Surgery Procedures	
M.P. Torres and W. Aperador	109
Implementation of Boundary Conditions in Discrete Element Modeling of Rock Cutting under Pressure	
N.M. Tropin, A.V. Manakov and O.B. Bocharov	114
The Research of the Dynamics of the Manipulator of the Parallel Structure with the Flexible Links	
N.N. Prokopenko, Y.A. Valiukevich and A.V. Alepko	119
Determination of Cutting Disc Deformation Using Axial Forces Produced during the Cutting Process	
E. Akarslan, F.O. Hocaoglu and I. Ucun	124
Performance Improvement on Axial-Flow Fan by Imposing Proper Frame Ribs	
S.C. Lin, F.Y. Wang, C.J. Chang, H.C. Yen and Y.J. Cheng	129
Acoustic-Emission Wave Response to a Dislocation Source in Layered Media	
R.C. Zhang	135
Mechanical Design of Lower Extremity Exoskeleton Assisting Walking of Load Carrying Human	
Y. Şahin, F.M. Botsalı, M. Kalyoncu, M. Tinkir, Ü. Önen, N. Yılmaz and A. Çakan	141
Integration of Crashworthiness Aspects into Preliminary Aircraft Design	
D.B. Schwinn	146
Exit Geometry Effect on Jet Mixing	
J. Mitruka, P.K. Singh and E. Rathakrishnan	151
NAM Application for Simulation of Unsteady Separation Flow around Airfoil with Spoiler	
V.A. Frolov, K.V. Redkina and L. He	156
An Improved Weld Seam Extraction Method Using Saliency Detection for Pipe-Line Welding Based on GMAW and Passive Light	
P.Y. Zhou, J. Li, N.M. Shen and F. Li	160
Optimization of Cutting Parameters of CNC Milling for Aircraft Components Using Design of Experiments	
G.K. Nithyanandam, S. Senthamizh, P. Selvaraj and P. Radhakrishnan	164
Application of Active Damping Control Using Piezoelectric Material in Modeling of a Wind Turbine Blade	
D.W. Guo, Z.C. Xie and W.L. Cheng	169
Modeling of a Wind Turbine Blade Coupled with Aerodynamic Loads in Passive Damping Control	
D.W. Guo, Z.C. Xie and L. Zhang	174
Sensitivity Analysis and Optimization of Machining Parameters Based on Surface Roughness Prediction for AA6061	
E. Yahya, G.F. Ding and S.F. Qin	181
The Research of Five-Axis NC High Efficient Machining Technology for UAV Integral Impeller	
H. Zhao, Y.J. Cai and G.H. Li	189
A New Method of Stress Linearization for Design by Analysis in Pressure Vessel Design	
H.J. Li, Q. Ding and X. Huang	194
The Study on the Influence of Gust Wind on Vehicle Stability	
C. Wang, H.B. Huang and S.F. Xu	198

Study of Nonlinear Dynamics of Rotor-Bearing System Coupled with a Floating Raft Isolation Device W. Zhao and M. Li	202
Numerical Simulation on the Performance of Vertical Jet Flowmeter of Natural Gas X.H. Wang, Z. Xiao and K. Zhang	206
Engine Fault Diagnosis Based on EEMD Difference Energy Spectrum H.X. Pan, G.X. Guo and H.F. Ren	210
Establishing System Requirements of an Aviation Piston Engine E. Kivilcim and B. Banu	215
Development of New Vehicle Power Integration System C.C. Yu, J.S. Chen and Y.W. Lee	219
Simple Engine Exhaust Temperature Modeling and System Identification Based on Markov Chain Monte Carlo Z.M. Ye and H. Mohamadian	224
FEM-Based Topological Optimization on the Spindle Box of Heavy Duty CNC Lathe Machine C.S. Gao, Z. Liu, J.S. Zhao, L.P. Zhang and Y.S. Zhao	229
Effect of Excitation Waveforms on Biomimetic Cilia-Based Micromixing J. Kongthon	233
Numerical Prediction of the Magneto Plasma Dynamic Thrusters' Performance A.M. Tahsini	239
Fault Diagnosis of Rolling Bearing on the Basis of Wavelet Neural Network S.L. Wu, J.X. Liu and L. Li	244
Characterizing and Modeling Mechanical Properties of Circulating Tumor Cells by One-Way Fluid Structure Interaction Simulation F. Gao, G. Li, T. Nagasaka, M. Hayase and H. Okada	250

Chapter 3: Applied Thermodynamics and Heat Engineering

Influence of Thermal Decomposition of Ammonia Propellant in Solar Thermal Propulsion B.Y. Xing, M.C. Huang, M.S. Cheng and K. Liu	257
Study of Heat Rejection in Triple Natural Draft Dry Cooling Towers under Crosswind Using Radiator-Type Windbreakers A. Hozhabr, R. Radi, H. Chenari, A. Chogani and M. Esmaeilipour	265
Enhancement of Natural Convection by Impingement of Corona Wind P. Bhalariao and F.C. Lai	271
A Study on Thermal Fatigue Life Variation According to Thermal Exposure Time Y.S. Kim, D.K. Lee, J.M. Lee, H.W. Song, S.H. Kim, J.M. Koo, C.S. Seok and M.R. Cho	276
Fluid-Solid Coupled Simulation of a Novel Platelet Heat Exchanger Used in Solar Thermal Thruster B.Y. Xing, M.C. Huang, M.S. Cheng and K. Liu	281
Heat Dissipation Capacity of Heat Sink Assembly with/without Vortex Generators S.C. Lin, C.J. Chang, F.Y. Wang, H.C. Hsiao, S.K. Yang and C.Y. Hsiao	288
Numerical Study of the Temperature History of Thermally Protected Blunt Nose during Flight A.M. Tahsini and S.A. Hosseini	294
Ablative Heat Shield Design for Reentry Vehicle Using Numerical Analysis A.M. Tahsini and S.T. Mousavi	298
Ground-Based Study on Distribution of Fire Parameters and Installation of Fire Detectors in Space-Confined Microgravity X.W. Wang, H.B. Hu, J. Qin and Y.M. Zhang	304
Determination of Optimum Surface Distribution in Triple-Effect Evaporator S. Chantasiriwan	309

Chapter 4: Energy Engineering

An Epoxy-Based Micro-Structure Surface for Improving Anti-Reflection Efficiency of a Solar Cell Module	
M.J. Tsai, S.Y. Chen, J.W. Chen, R.B. Huang and T.L. Lin	317
Charge Redistribution in Flextensional Piezoelectric Energy Harvesters	
Z.B. Yang and J. Zu	322
Efficiency Enhancement of Organic Solar Cells with Process-Optimized Silver Nanoprisms	
Q. Zhang, W.J. Qin, H.Q. Cao, L.Y. Yang and S.G. Yin	327
Development of a Radioisotope Heated Hollow Cathode	
K. Mboyi, J.X. Ren and Y. Liu	331
Application of MMAE to the Fault Detection of Lithium-Ion Battery	
Z. Liu and A. Sohel	342
Collector Design of Tracking System Based on PLC	
Y.Q. Lu, E.D. Hu and Z.X. Yuan	347

Chapter 5: Electrical Engineering

Effect of Electrode Length on the Performance of EHD Gas Pump	
Y.T. Birhane, S.C. Lin and F.C. Lai	355
The Dependence of Carrier Distribution on Gate Capacitance of α-IGZO TFTs	
C.C. Hsu and C.H. Wu	361
An Improved Low-Offset and Low-Power Design of Comparator for Flash ADC	
S. Zhang, Z.M. Wang and L. Zhou	365
The Research of a Variable-Focus Ultrasonic Liquid Lens	
Y. Wang, W. Wang, X. Zhou and F.L. Zhai	371

Chapter 6: Algorithms, Signal and Data Processing, Monitoring and Identification

Development of the Multimethod Genetic Algorithm for the Strip Packing Problem	
V.A. Chekanin and A.V. Chekanin	377
Automatic Discovery Approach of Digital Image Topic	
C. Jin and S.W. Jin	382
Multilevel Linked Data Structure for the Multidimensional Orthogonal Packing Problem	
V.A. Chekanin and A.V. Chekanin	387
Fuzzy Classification Maximum Likelihood Clustering with T-Distributions	
M.S. Yang, C.Y. Lin and Y.C. Tian	392
A Simplified Branch-and-Price Mechanism for a Three-Machine Dynamic PCB Assembly	
M.T. Yazdani Sabouni and R. Logendran	398
Fast Calculation of Bayesian Unconditional Cramer-Rao Bounds in Case the State-Vector is Constant	
N.A. Berkovskii and D.G. Arsenjev	404
The Coupling of RBF and FDM for Solving Higher Order Fractional Partial Differential Equations	
Z. Avazzadeh, W. Chen and V. Reza Hosseini	409
Equating Heteroclinic Orbits in Chen System by Using Scaling Logarithm Change Series (SLS) Method	
S.U.D. Khan and S.U.D. Khan	414
A Fractal Mutation Factor Modified Differential Evolution Algorithm	
X.H. Qiu, B. Li, Z.Y. Cui and J. Li	418
The Design of Sustainability Assessment Data Warehouse for Shanghai Airport	
G.H. Yuan, C.J. Fan, Y.P. Yang, W.J. Liu and X.L. Ran	424
Classification Processing Method of Cotton Foreign Fibers Based on Probability Statistics and BP Neural Network	
J.F. Wang, Y.H. Du, X.M. Jiang, Y.H. Luo and X. Li	428
An Identification Method to Detect the Movement of Smoke in Video	
S.J. Zhu, C.J. Liu and Q. Wang	432

Study on the SVM Processing Model of the GPS Monitoring Data of Coal Mine Subsidence J. Zhang	436
An Effective System Identification Method of Small-Scale Unmanned Helicopter Y.Z. Liu and F. Hu	442
New Type of Takagi-Sugeno Fuzzy Inference System as Universal Approximator I. Anikin and I. Zinoviev	453
Study on a New Type of Automobile Exhaust Detecting System R.H. Quan, W.J. Wang, J.F. Wu, L.F. Hou and G.F. Tang	459
Application of Remote Sensing Data on Dynamic Monitoring of Coastline in the Yellow River Delta J. Chang, T. Li and W. Liu	463
Factors and Optimization Methods of Error in Reverse Engineering Practical Application K. Li, Y.J. Cai and Y.S. Liu	467
Remove Mesh Self-Intersections Based on Light Projection Algorithm Z.W. Huang, N. Dai, C.Y. Guo, C.Y. Wu, W. Yin and Y.H. Tang	471
Use Improved Gradient Descent in Irregular Boundary Conditions in Molecular Dynamics F. Su, S. Tissera, T. Lukas and A. Munjiza	476
Research on Recommendation System Selection Based on Fuzzy VIKOR with Multiple Distances B.W. Sun, M. Li and W. Zhang	481
Eigenfunctions of Rayleigh Wave in Viscoelastic Halfspace D.M. Chang and X.F. Liu	486

Chapter 7: Control Systems

Backward Difference Scheme for Simulating Unsteady Compressible Flow on Deforming Mesh in an Implicit Adaptive Solver S.R. Ray and J. Ballmann	493
Semi-Forward Adaptive Simulation Approach for Tube Hydroforming Loading Path Determination Using a Strain Trajectory Based Fuzzy Logic Control R. Kesvarakul, T. Intarakumthornchai and S. Jirathearanat	498
Prediction of Aeroacoustic and Control over a Cavity by Delayed Detached Eddy Simulation Y. Liu and M.B. Tong	505
Control of FES-Assisted Elliptical Stepping Exercise Using Fuzzy Logic Controller S.Z. Yahaya, Z. Hussain, R. Boudville and M.N. Taib	510
Implementation of PID Controller with PSO Tuning for FES-Assisted Exercise S.Z. Yahaya, Z. Hussain, R. Boudville and M.N. Taib	516
Modeling and Controller Comparison for Quarter Car Suspension System by Using PID and Type-1 Fuzzy Logic A. Çakan, F.M. Botsalı and M. Tinkir	524
Theoretical Investigation of a Structure for Active Vibration Control with Fuzzy Logic Approach E. Gülbahçe, M. Çelik and M. Tinkir	529
Tuning Method of Fractional Order Controllers for Vibration Suppression in Smart Structures C.I. Muresan, O. Prodan and S. Folea	534
CNC Routine for Manufacturing Spur Gear O.M. Koura	539
Force Feedback Control of Lower Extremity Exoskeleton Assisting of Load Carrying Human Y. Şahin, F.M. Botsalı, M. Kalyoncu, M. Tinkir, Ü. Önen, N. Yılmaz, Ö.K. Baykan and A. Çakan	546
Attitude Control of a Quadcopter Using Adaptive Control Technique R. Ibarra, S. Florida, W. Rodríguez, G. Romero, D. Lara and I. Pérez	551
Some Kinds of Pseudo-Intelligent Control Systems for Selecting Trajectories of Flight Vehicles A.V. Proletarsky, K.A. Neusipin and K. Shen	557

Numerical Investigations of Synthetic Jet Control for TAU0015 Airfoil X.P. Xu, Z. Zhou and R. Wang	562
Base on Real Time Temperature Monitoring and Sprinkler Cooling Control to Achieve Energy Conservation of Air-Conditioning Systems S.S. Hung, H.C. Chang and H.H. Lee	568
Numerical Control System Research and Development of Acrobatic Stage P.X. Cao, H.B. Cui, X.Y. Liu, X.S. Yu and C.L. Liu	574
Design and Research on Control System of 200Kw Organic Working Fluid Turbine J. Pan, Y. Huang, W. Gao and Y.P. Zhang	578
The Design of an Intelligent EEG Monitoring and Control System P. Wang, G.Z. Xu, L. Wang and C.L. Liu	583
Boiler Flue Gas Treatment of Cooling Water Circulation Device Control System Based on PLC Q.P. Wang, L. Han, M. Zhang and F. Li	587
Machining Feature-Based CAD/CAPP for STEP-NC L.Y. Zhang	591
Knee-FES-Ergometer for Paretic Knee Swinging Exercise: Tuning of PID Controller Using PSO R. Boudville, Z. Hussain, S.Z. Yahaya, M.N. Taib and F. Ahmad	595

Chapter 8: Mechatronics and Robotics

Robotic Impedance Control with Fuzzy Sliding Model Control Strategy S.J. Huang, C.K. Yu and Y.M. Huang	605
Structure Design of Climbing Snake-Like Robot for Detection of Cable-Stayed Bridge W. Wei, J.X. Yu, W.H. Lin, R.S. Mai, C.X. Chen, Z.Y. He and Z. Li	610
Design and Control Architecture of a Small Mobile Robot with Hybrid Locomotion System B. Aisham, Q. Bakhsh, K. Hasnan and A. Ahmed	619
Palletizing Robot Dynamic Analysis and Simulation L.J. Liang and X.G. Gao	623
Study and Discussion on Related Technologies of RoboCup Robots D. Zhao, Y.H. Du, B.L. Wu, C. Wu and M. Li	627

Chapter 9: Industrial Engineering and Information Technologies

Optimal Combined Forecasting Method for Foreign Workers in Chiangmai M. Rajchakit	633
Flexible Job Shop Models for Solving Scheduling and Layout Problems Using Coloured Petri Nets J. Eloundou, D. Baudry, M. Sahnoun, A. Bensrhair, A. Louis and B. Mazari	638
Methodology of Developing Mathematical Models for Quality Indices Control M. Polyakova and A. Korchunov	643
Defects Reduction in Steering Gear Product Using Six Sigma Methodology G.K. Nithyanandam, M. Raju and G. Srinivasan	647
Energy Efficient Manufacturing and Supply Systems – Case Studies and Results B. Wu and J. Abad	652
The Power Plant Bidding Strategy in Contract Market F.G. Dong	656
Simulation Based Multi-Criteria Assessment of Lean Material Flow Design Alternatives M.P. Roessler, E. Abele and J. Metternich	661
Research on Assessing Airport Sustainable Development Ability Based on Particle Swarm Optimization Algorithm G.H. Yuan, C.J. Fan, Y.P. Yang and L.A. Huo	667
Differently Defined Flying Zone and State Approach in Case of Airborne Volcanic Ash: Impact on Flight Operations R. Vujasinović, A. Kuenz and A.R. Schmitt	672

Simulation Study for the Performance Impacts of Video Multicast Caused by In-Cast in Cloud Computing Environment	677
Y.W. Chen, Y.S. Ho and C.C. Sun	
Implementation of Reconciliation Protocol Based on DSP	682
W.Y. Liu	
Construction of Cotton Seeds Quality Security Information System Based on RFID	686
B.X. Ma, J.C. Chen, W. Zhang, J. Yang and Y.X. Wang	
A Hybrid Encryption Scheme for Hadoop Based on Symmetric and Asymmetric Encryption	691
L. Song, J. Qin, S.X. Liang and X. Wang	
Research on Innovation of Archives Management under Cloud Service Model	695
Z.H. Xia, G.H. Zhan, D.L. Zhang, M.L. Geng and B.F. Liu	
SWOT Strategic Optimization of Government Portal under the Background of Web 2.0	699
Y.H. Hua, G.H. Zhan, M.L. Geng, P.F. Li and B.F. Liu	
Conformance Testing for SGSF-064-1	704
I. Kim, T.W. Awan, A.M. Abed and H.S. Jang	
Simulation of Efficient Vehicle Dispatching and Routing for the Application in Intelligent Transportation System	709
Y.W. Chen, C.W. Chen, X.C. Chen and A.Y.S. Su	
Synchronization and Parameter Identification of General Uncertain Complex Networks via Discrete Control	714
S.Q. Jiang, G.L. Cai and S.M. Cai	
Delay-Dependent Stability of Cellular Neural Networks with Multiple Delays	718
G. Rajchakit	
Evaluation of Guidance Laws Performance Sing Genetic Algorithm	723
M. Zakaria, T. Ibrahim, A.E.D.S. Hafez and H. Abdin	
Research on Lane Departure Warning System	731
H.B. Yang	
An Approach to the Construction of the Personalized Knowledge Map in Knowledge Management Systems	736
M. Li, B.W. Sun and W. Zhang	

Chapter 10: Information Technologies in Civil Engineering

Dynamic Experiments on a 1/4 Scale New-Styled Korean Traditional Wooden House	743
Y.M. Kim	
Spatial Structure of Land Use Based on Fractal Theory: Taking Shaoguan as an Example	747
W. Wei and X.Y. Chen	
Research on ‘Three Zones’ of Goaf Spontaneous Combustion with U+L Ventilation	753
Y.X. Zhao, C.H. Chen, F. He and J.W. Li	
Firefighting Tactics during a Fire Event at a Nightclub	758
C.S. Lin and C.C. Lai	