## **Table of Contents**

**Preface, Committees and Sponsors** 

## **Chapter 1: Materials Science, Structural Composites, Material Processing**

Analysis and Modeling of Wafer Thermal Transfer in a PECVD Reactor H.X. Xia, D. Xiang, P. Mou and H. Zhang	3
Effect of Physical Parameters on DeNOx Conversion in Selective Catalytic Converter Used in Diesel Vehicles	
A.P. Manoj Kumar and P. Mohanan	13
Powder Injection Molding of 20-40 Vol.% Silicon Carbide Particulate-Reinforced Aluminum Composites	
T. Patcharawit, P. Tongkhon, A. Wiangsamut, P. Auisungnoen and N. Chuankrerkkul	17
The Study of Manufacturing and Ingot Characterization of U-Zr Alloys Masrukan	23
<b>Dyeing of Blended Fabric with Pigment</b> Z.Q. Zhang and Y. Wu	30
Table Type Sun Drying for Seaweed Preservation I.W. Surata, T.G.T. Nindhia and I.K.A. Atmika	34
SPS Method for Manufacturing Carbide Materials N. Jalabadze, L. Nadaraia and L. Khundadze	38
Friction Stir Welding of Dissimilar 5xxx to 6xxx Al Alloys: A Review S.N. Pandya and J.V. Menghani	42
Oxidation of Nb/Nb <sub>5</sub> Si <sub>3</sub> <i>In Situ</i> Composites Fabricated via Spark Plasma Sintering with Al Addition	
W.Y. Long, X.Y. Zou, W.D. Wang and J.P. Yao	49
Effect of Co Addition on the Microstructure of Matrix in Tungsten Carbide Reinforced Surface Composite	<i>5.</i> 4
Z.L. Li, Q. Shan, Y.H. Jiang, R. Zhou and Y.D. Sui  Lifetime Prediction of Fire Extinguishing Pipeline by Means of Extreme Value Statistics	54
J.A. Jeong and C.K. Jin	60
Acetylene Ignition Process in Combustion Thermal Spray W.L. Guo and Z. Guo	65
In-Plane Shear Damage Prediction of Composite Sandwich Panel with Foam Core A. Mostafa and K. Shankar	69
The Influences of Reheating Process to the Semi-Solid Microstructure of Hypereutectic Al- 22Si-1.93Fe-1.36Mn Alloy by Cooling Slope	
L. Li and R.F. Zhou	74
Laminar Burning Velocity and Flammability Characteristics of Biogas in Spark Ignited Premix Combustion at Reduced Pressure	
W. Anggono, I.N.G. Wardana, M. Lawes, K.J. Hughes, S. Wahyudi and N. Hamidi	79
Chapter 2: Nanomaterials Science	
Effect of TiO <sub>2</sub> Nanoparticles on Tensile and Photodegradation Behavior of Biopolymer Films Based on Poly(Butylene Succinate)	
A. Buasri, N. Chaiyut, V. Loryuenyong, M. Worachat, R. Kanchanapradit and S. Baibou	89
Effects of pH on Tin Nanoparticles Prepared Using a Modified Polyol Synthesis S.S. Chee and J.H. Lee	93
Nanofiber: Applications and Implementation in Advance Water Treatment Techniques M.O. Aijaz, S. Faiz, U.A. Samad, F.S. Al Mubaddel, M. Luqman and O.Y. Alothman	97

## **Chapter 3: Mechanical Properties of Materials, Deformation, Coating Engineering**

Finite Element Study on the Influence of Shear Key Diameter on the Shear Performance of Composite Sandwich Panel with PU Foam Core A. Mostafa and K. Shankar	103
Study on the Rock Slope Landslide Caused by Earth Penetrating Weapon Explosion J.Z. Hao, C.C. Shi, J. Li and Y.H. Sun	103
Stress Analysis of the Suspended Centrifuge Drum for Sugar S. Zhang, W. Wang, C.G. Huang and Y.Z. Li	113
1000mm <sup>2</sup> Conductor Creep Characteristics and Temperature Reduction Value Y. Qi, X.M. Rui, J.C. Wan and J.H. Li	118
Effects of Hard Segment Contents on Dynamic Mechanical Properties of Gap-Based Polyurethane Elastomers	105
H.Q. Ding, L.Q. Xiao, W.L. Zhou, L.R. He and H.L. Zhang Strength of Extreme Soils Blended with Fly Ashes for Pavement	125
S.M.P. Kumar	130
Effect of Internal Pressure and Dent Depth on Strain Distribution of Pressurized Pipe Subjected to Indentation	
M. Řamezani and T.R. Neitzert	135
Research on In-Planestatic Mechanical Performance of Honeycomb Paperboard Based on Virtual Simulation	
X.N. Mu, C. Sun, L.Q. Huang and Y.S. Ma	140
Microstructure and Hardness of Fe-Based Coating by Plasma Cladding L.M. Wang, J.B. Liu and J.S. Jiang	144
Fabrication and Mechanical Properties Study of the Magnetorheological Elastomer G.H. Li, X.G. Huang, X.Y. Gu and J. Wang	148
Microstructure and Mechanical Properties of Ti/Cu-Cr/S20C and Ti/Cu-Ag/S20C Clad Composites	152
J.S. Ha and S.I. Hong  Investigation on Effect of the Pitch of Shear Keys on the In-Plane Shear Performance of	153
Sandwich Panels with PU Foam Core: FE Study A. Mostafa and K. Shankar	158
Effect of Thermo-Mechanical Treatment (TMT) on Hardness of Heat-Treated Al-Mg-Si (6082) Alloys: Experimental Correlation Using (DOE) Method M.M. Tash and S. Alkahtani	163
Stress Intensity Factor of Different Position Plates with Eccentric Crack M.M. Wang, M. Yan and X.J. Zhu	173
Fatigue Crack Initiation Mechanism of Aluminium Alloy Welded Joint in Gigacycle Fatigue C. He, S.M. Cui, Y.Z. Wu, Z.F. Luo and Q.Y. Wang	177
Stress Analysis of Reeled Composite Pipelines Based on Shallow Shell Theories T.M.B. Albarody, M.B. Zahiraniza and M.B. Taufiq	181
Pipeline Reeling T.M.B. Albarody, M.B. Zahiraniza and M. Badri Taufiq	185
Effect of Surface Preparation by Non-Directional Grinding on Properties of AISI D2	
Plasma-Nitride Layer S. Rajsiri, T. Kraiha, L. Plangklang and U. Chairue	190
Chapter 4: Computing Methods and Algorithms	
Solving Job Shop Scheduling Problem Based on Employee Availability Constraint G. Ramya and M. Chandrasekaran	197
Assessment of Perturbation and Homotopy-Perturbation Methods for Solving Nonlinear Oscillator Equations M. Ramezani and T.R. Neitzert	207
111. INHIVERHII MIN I .IX, I WIVEVI	207

Application of Least Squares Algorithm on Maps Building for Mobile Robot T.Y. Guo, W. Liu, Z.J. Du and H.C. Wang	216
Vibration Analysis of Multi-Cracked Beam Traversed by Moving Masses Using Discrete Element Technique	
R. Alebrahim, N.A.N. Mohamed, S.M. Haris and S.S.K. Singh	220
The K-Exemplars Clustering Method H.H. Kao, L.C. Huang, M.J. Wen and K.L. Wu	224
Nonlinear Numerical Analysis of SRC Frame Middle Joints C. Li, Y. Zou, J. Kong and Z.W. Wan	231
Two-Dimensional Dynamic Analysis of an Ocean Umbilical Cable Using the Geometrically Exact Beam Elements W.C. Quan, Z.Y. Zhang, A.Q. Zhang and Q.F. Zhang	236
Modeling and Analysis of the Proportional Control Four-Wheel Steering Vehicle Handling and Stability S.J. Zhang and H.Z. Sun	243
Research on Numerical Problem in the Simulation Statics Analysis Program of High Speed Ball Bearing	
M. Yan, M.M. Wang and X.J. Zhu  Application of Optimal Algorithm on Trajectory Planning of Mechanical Arm Based on B-	248
Spline Curve	252
T.Y. Guo, F. Li, K. Huang, F.Z. Zhang and Q. Feng Using Genetic Algorithm for the PID Control of Voice Coil Actuator in A Precision	253
Locating System and Simulation W.J. Zhang	257
Random Vibration Analysis for a Building under Evolutionary Random Excitations Z.Y. Sun, H. Wang, Y.S. Zhang and L.W. Yan	262
Application of Axiom System in the Construction Method of BDD  X. Zhang and D.H. Hu	267
Artificial Immune System for Multiple-Fuel-Constrained Generation Scheduling C.L. Chiang	272
Chapter 5: Experimental Methods and Studies	
Experimental Study on Hydraulic Characteristics of X-Shape Flaring Gate Pier and Deflecting Stilling Basin United Energy Dissipator W.R. Wei	279
Interface Cracking and Fracture in As-Roll-Bonded and Heat-Treated 3-Ply Cu/Al/Cu Hybrid Plate	
I.K. Kim and S.I. Hong  Improvements in the Performance of Impressed Current Cathodic Protection System with Variable Resistor at Various Environmental Conditions	284
J.A. Jeong and C.K. Jin	288
Determination of Losses & Loss Coefficients of Solar Flat Plate Collector when Wind Velocity & Tilt Angle at Zero Value – An Experimental Study M.K. Bhatt, B.M. Sutaria, S.N. Gaderia and S.A. Channiwala	294
Experimental Investigation of CO <sub>2</sub> Separation from Lignite Flue Gases by 100 cm <sup>2</sup> Single Molten Carbonate Fuel Cell J. Milewski, W. Bujalski, M. Wołowicz, K. Futyma and R. Bernat	299
v. mnewski, w. Dujuiski, m. wolowicz, k. i utyma and k. Demat	<i>433</i>
Chapter 6: Design, Modelling, Simulation and Optimization	
Technologies, CAD Applications	
	307
Technologies, CAD Applications  The Application of Lightweight Visualization Tool-Product View to Aircraft Development	307 312

Aerodynamic Heating Numerical Simulation of Terminal-Sensitive Projectile at Deceleration and Despinning Trajectory	217
J. Zhang, R.Z. Liu, R. Guo and X.D. Ma  Modeling the CAD-CAE Collaborative Process Using Colored Petri Nets	317
Q.F. Sun and H. Zhao	323
Optimal Design of a Speed Reducer M.H. Lin and J.F. Tsai	327
<b>Evaluation of Gun Support Structure Using Equivalent Dynamic Approach in Non Linear FEA</b>	
S. Shukla, H.S. Deshmukh, P. Vinaay and B.A. Thite A.	331
PV Array Mathematical Model Optimization Based on Monitoring Data Q.W. Zhong, Y. Xu, J. Yang and Z. Meng	336
Aerodynamic Simulation of Road Vehicle in Steady Crosswind S.L. Han, R.X. Yu, Y.Y. Wang and G.S. Wang	341
<b>2D</b> Unstructured Mesh Finite Volume Method for Simulating Structural Dynamics M.Y. Hai, X.H. Su, Y. Cao, Y. Zhao and J.T. Zhang	345
Precision Motion of Iterative Learning Controller Using Adaptive Filter Bandwidth Tuning by Improved Particle Swarm Optimization Technique Y.C. Huang, S.T. Li and K.H. Peng	349
A Numerical Study on the Optimum Design of Mechanical Wind-Supply and Smoke- Exhausting Systems Based on the Bench-Scale Long Channel	317
Y. Li	354
Simulation of the Performance of a Twin-Rotor Piston Engine T.A. Zou, C.Y. Pan, H.J. Xu and X. Zhang	360
Surface Lunar Soil Excavation Simulation Based on Three-Dimensional Discrete Element Method	266
H. Gao, D.W. Zhang, B. Liu and L.C. Duan  Study on Optimization Design Technique of Aviation Gear Body	366
Y.Y. Shi, R. Yang, X.F. Kong, M.Q. Zhang and J.H. Li	371
Serration Design and Simulation of Gear Plunge Shaving Cutter S.L. Chang, C.K. Huang, K.H. Doan and J.H. Liu	377
Designing Fuzzy Backstepping Adaptive Based Fuzzy Estimator Variable Structure Control: Applied to Internal Combustion Engine M.J. Nekooei, K. Jaswar and A. Priyanto	383
Structural Design and Analysis of the Motionlink in the Dynamic Assembled Screw-Driven	
Device Y.F. Feng, X.J. Xu, H.J. Xu, X. Zhang, F.L. Zhou and R. Wang	390
<b>Application of Variable Structure Control on Muti-Axle Vehicle Steering System</b> C. Liu, L. Yu and X.H. Gao	395
Optimization of Spillway Weir to Mitigate Gas Entrainment in a Fast Reactor G. Senthilkumar and S. Ramachandran	402
<b>Modal Characteristics of Compressor Blades Considering Fluid-Solid Interaction</b> Q.G. Luo, D.Y. Si, Z.G. Ran and X.D. Wang	407
Comparison Analysis of Piezoelectric Vibration Control Methods for Autobody Thin-Wall Structure	
C.L. Shen, X.W. An, Y. Han and D.X. Wang	411
Machining of NURBS Surfaces Using Three-Axis NC Milling Machine S.S. Yeh, W.C. Chen and J.T. Sun	417
Comparison of Bending Stress of a Helical Gear for Different Materials and Modules Using AGMA Standards in FEA S. Prabhakaran and S. Ramachandran	423
Simulation of MEMS Cantilever Biosensor and Analysis of Readout Methods for	123
Tuberculosis Detection P. Sangeetha and A.V. Juliet	428

## **Chapter 7: Automation and Control, Detection and Tracking Technologies**

Research on Image Binding Mechanism Based on Kinect Skeletal Tracking in Virtual Fitting System	
L. Miao, S.Y. Shang and C.X. Cai	437
Fault Diagnosis Method of Gearbox Based on Local Mean Decomposition J. Zhang, H.M. Li, Y.F. Tang and Q.Q. Wang	441
Nonlinear Adaptive Feedback Control for Spacecraft Proximity Formation Flying T. Xi, J.C. Li and W.Q. Pan	446
<b>Signal Detection Technology for Low Voltage Arc Fault Circuit Interrupter Using FPGA</b> S.C. Wang, H.C. Lee and C.J. Wu	451
Dynamic Targets Detection for Robotic Applications Using Panoramic Camera Based on	
Optical Flow W. Zhu, L. Tian, F. Di, J.L. Li and K.J. Li	455
Chapter 8: Advanced Technologies in Industry, Safety and Assessment	
<b>Distribution and Potential Risk of Copper in Surface Sediments of Anping Harbor, Taiwan</b> C.D. Dong, C.F. Chen and C.W. Chen	463
Hazard Identification & Risk Assesment in New Chassis Assembly Line J. Sripathi Raja, M. Siva Prakash, N. Vellaichamy, K.L. Senthil Kumar and K. Palani	468
Ip Header Compression in IEEE 802.11 Mac Layer M. Boopathi and M.P. Vani	476
Petri Net Applied in Pulverizing System Reliability Analysis Y. Li	481
Research on Evaluating Methods of Automobile Energy-Saving for Management	
Technology X. Li, L. Liu and Z.X. Li	489