

Table of Contents

Editorial and Review Panel Members

I. Sustainable Development and Technologies

A Conceptual Model for Sustainable Product Design A. Romli, P. Prickett, R. Setchi and S. Shoe	3
Eco-Design of a Basin Mixer in Geometric Modeling Phase R. Gaha, A. Benamara and B. Yannou	7
Improving Green Product Design with Closed-Loop Product Recovery Information Y.T. Ng, W.F. Lu and B. Song	12
Research Trend of Green Design Y.M. Li and Y. Xiong	16
Methodology for an Integrated Life Cycle Approach to Design for Environment J.S.C. Low, W.F. Lu and B. Song	20
Defining the Social Dimension of Sustainability in Product Design M. Watkins	24
Glass Fibre Reinforced Composites from Recycled Polymers A. Ianakiev and H. Cheah	28
Structural Analysis of Horizontal Tidal Current Turbine Main Shaft F.K. Kong, Y.W. Zhu and Y.T. Li	32
Development of Buoy-Type Wave Energy Generating Device F. Zhang, B.Y. Song, K. Li and S. Zhang	36
Environmental Impact Assessment: Challenges in Use of Methods and Tools in France and in Russia N. Sirina, S. Rohmer and E. Fortyguina	40
Comparison of Different Life Cycle Impact Assessment Software Tools Z.M. Ren and D.Z. Su	44
Case Studies of Taiwan's Fuel Cell System Demonstration Program C.M. Liu, Y.L. Lin, C.C. Yang, S.Y. Huang and L.C. Wen	50
Comparative Analysis of LED Commercial Lighting Systems J. Leijting	54
Enabling (Bio) Materials: Feasibility Study for its Implementation in Development of Sustainable Lighting Product D. Jin and S. Goldbach	58
Assessment of Low Cost, Sustainable, Reflective Layers for Optical Mixing W. Peels, K. Cheng, J. Hu, J. Jiao, D. Jin, H. Rebergen, P. Sun and R. van Wijk	62
Biomimicry: Natural Systems <i>In Situ</i> Analysis, Aimed to Rain Water Harvesting A.S. Ortega, R.V. Uribe, J.D.H. Delgado, S.A.U. Cobos, M.A.R. Toledo, E.R. Gutiérrez and A.H. Zimbrón	66
Combined Design of a Compact Production System and Services for Sustainability N. Mishima	70
Product Innovations and Eco-Sustainability: An Approach to Evaluate the Relationships A. Papetti, M. Germani and M. Mandolini	74
Forming the Nucleus of a Novel Ecological Accounting System: The myEcoCost Approach J. von Geibler, K. Wiesen, R.S. Mostyn, M. Werner, N. Riera, D.Z. Su, S.É. Björling, T. Domen, J. Smith, A. Jenkins and S. Kresse	78
Total Quality Environmental Management Toward Sustainability: Need and Implementation in Libyan Food Industry A. Saad, D.Z. Su, P. Marsh and Z.M. Wu	84
Development of an Online System for Recycling Consumer Electronic Products Using the Internet, NFC and RFID Technologies W.J. Peng and D.Z. Su	90

II. Product/Industrial Design and Design Methodologies

Information Flows and Design Intent in the Core of Future Product-Services in the Field of Manufacturing Industry M. Lanz, E. Järvenpää and P. Andersson	103
Framework of Man-Machine-Environment Application System Engineering throughout Life Cycle of Large Scale Vessel Z. Shang, S.F. Zhu and C.H. Qiu	107
Formalization of Reconfigurable Mechanisms in Task Based Conceptual Design Method H. Darbinyan	111
A Fast Approach of Locating Complex System Design Errors Z.Y. Chen, S.B. Huang and L.L. Han	115
Coordination of Design Processes in Two Perspectives of Computer Aided Design L. Kotulski, A. Sędziwy and B. Strug	119
Application of Baseline in Configuration Management for Aerospace Product Design Y. Zheng, S.Y. Li, J.T. Xi and H. Wu	123
An Ontology-Based Framework for Ergonomics Knowledge Classification and Representation Y.Z. Jiang, S.F. Zhu and Z. Shang	127
A Design of an Optical System of Liquid Filled Lens which can Adjust the Focus D. Shaw and H.A. Hsieh	131
Prosthesis Analysis Based on TRIZ R.I. Flores-Luna, J.M. Dorador-González and A. Espinosa-Bautista	135
Module Matching Method Based on the Gray Theory J. Li	139
Factors Influencing Furniture Sales in High-Income Segments of Society M.H. Kazemifar and Y. Khodadadeh	143
Graph Based Method for the Modelling of Crumpled Structures S. Rohmer, A. Merat, V. Floderer and A. Copinet	147
Study of the Technical Feasibility and Design of a Mini Head Screw Extruder Applied to Filament Deposition in Desktop 3-D Printer Z.C. Silveira, M.S. de Freitas, P. Inforçatti Neto, P.Y. Noritomi and J.V.L. Silva	151
A Feature-Based Section Curve Reconstructing Strategy H.T. Zhu and L. Cong	155

III. Engineering Design

Criteria for the Design of Converters and Breakers in Low Voltage DC Distribution Systems D.W. Meng, Y.F. Lu, Y.M. Xu and X.F. Wang	161
Simulation Research on Small Scale Wind Power Generation System Connected to DC Micro-Grid S.X. Qian, Y.S. Xiong, Y. Zhan, J.W. Xu and X.M. Shen	165
Handling and Stability Study on Non-Rod Aircraft Tractor in Backward-Motion H.B. Liu and N.J. Wang	169
An Experimental Stress Analysis of a Jib Crane A. Candas, S. Kurt, I. Gerdemeli and E. Kayaoglu	173
Experimental Stress Analysis of Elevator Guiding Equipment M. Altuntas, O. Salman and C.E. Imrak	177
The Diamond Wire Saw Test Bench Design and Loading Analysis Y.R. Zhang, L.Q. Wang, L.B. Guo and D.Y. Liu	181
The Application of BESO in Vibration Damping of Ship Plate X.Y. Teng, J.S. Han and L. Peng	185
Free In-Plane Vibration Analysis of Annular Plates with General Boundary Conditions D.Y. Shi, X.J. Shi, W.L. Li and Z.R. Qin	189

Dynamics Analysis and Vibration Isolation Design of Shared Foundation on Marine Turbo Generator Set	
C. Liu, C.H. Qiu and L. Gao	193
The Research on Shell Strength and Pressurize Reliability of Underwater Vehicle Mating Device	
Z.L. Zhang and L.Q. Wang	197
The Application of the Fireproof Wood Treated with Fire Retardant in the Warship Cabin	
W.B. Zhang	201
Influence of the Thermal Assembly Process on the Stress Distributions in Shrink Fit Joints	
M. Lorenzo, J.C. Pérez-Cerdán and C. Blanco	205
Interference Fit Stress Concentrations with Full Chamfered Hub	
J.C. Pérez-Cerdán, M. Lorenzo and C. Blanco	209
Modeling and Optimization of Process Parameters of a DF-CCP Etcher Chamber	
X. Xu, J. Feng and L. Tian	213
Design of a Long Distance Unidirectional Piezoelectric Motor Based on Non-Resonant Inchworm Principle	
W.F. Guo, J.J. Qu, J. Ding, Y. Qin and Y. Li	217
Study on the Adsorption of Carbonized Micron Wood Fiber Filter for the Nanoparticle Emissions of Diesel Engine	
D.F. Du	221
Parametric Camshaft Mechanism for Adaptive Building Envelope and Kinetic Building Ornaments	
F.U. Sjarifudin	225

IV. Production, Manufacture and Engineering Materials

Service Engineering: A Framework of Integrated Manufacturing System	
Q.Y. Chen, Z.H. Wu, Z.W. Deng and L.C. Luo	231
Production Scheduling for Sustainable Manufacturing Systems	
S. Ichoua and A. Pechmann	235
An Approach for Manufacturing Process Representation in Product Lifecycle Management	
N. Shariatzadeh, G. Sivard and L. Lindberg	239
Capability-Based Adaptation of Production Systems - Practical Case Study in TUT-Microfactory Environment	
E. Järvenpää, M. Lanz and R. Tuokko	245
Open Shop Dense Scheduling Algorithm Based on Semi-Matching Theory	
Y. Zhan, H.T. Zhu and Y.G. Zhong	249
State of the Art and Analysis of Design for Assembly of Large and Heavy Parts	
H.L. García-Guerra and J.M. Dorador-González	253
Provision of Long Item Materials	
M. Straub, S.J. Zhang, C. Manz and K. Hapeshi	257
Research on Measuring Accuracy Improvement for Tool Presetter	
J.S. Liu and J. Qian	261
Effective Forming Processes of Hub Forging from Aluminum Alloy AlCu₂SiMn	
A. Gontarz	265
Additive Tooling for Tube Hydroforming	
S.P. Soe, D.R. Eysers, C.H. Le and A. Romli	269
Application of Unstructured Finite Volume Method in Structural Static Mechanics	
W.D. Chen, Y.C. Yu, X.D. Wu, J.C. Li, P. Jia and F.C. Zhang	273
Electrodeposition and Tribological Properties of Self-Lubricating Sn-Ni-PTFE Composite Coating	
L.X. Ying, J.T. Yang, Y. Liu, Z.K. Yang and G.X. Wang	277
Research on the Surface Roughness Parameters of Micro-EDM	
Z.J. Chen, J.H. Shen and Y.T. Dai	281
Research on Statistical Parameters of 3-D Roughness for Micro Wire Electric Discharge Machining Surface	
L.B. Guo, H. Cui, B. Zhang and Z.H. Zhang	287

Improvement Arithmetic Method of Space Parameters of 3D Roughness for MWEDM Surface	
L.B. Guo, B. Zhang, H. Cui and Z.H. Zhang	291
The Mechanism of Electrochemical Discharge (ECD)	
M. Karnik, A. Ghosh and R. Shekhar	295
Rule Extraction from Support Vector Machine and its Application to Hot-Dip Galvanizing	
J.G. Wang, B. Yang, W.X. Zhang and B. Qin	300
Accelerated Production of White Pepper Using Integrated Mechanical and Enzymatic Solutions in an Automated Machine	
M.F. Ashari, M.D. Ibrahim, A. Husaini and A. Zulkharnain	304

V. CAD/CAM/CAE

Innovative Approach for Teaching Graphical Engineering Focused on CAD/CAM/CAE Systems	
J.C. Pérez-Cerdán, M. Lorenzo, A. Reveriego and C. Blanco	311
Transactional Model of Graph Transformations in Computer Aided Design	
L. Kotulski and B. Strug	315
Numerical Study on Mechanical Characteristics of Steam Turbine Valve Disc	
D.Y. Qu, Z.Y. Guo and C. Liu	319
Numerical Analysis of Feed Rate Influence on Hollow Hub Shape during Rolling Extrusion Process	
J. Bartnicki	323
Study on the Model of the Torch Tracks of CNC Flame Cutting of Rectangular Steel Pipes	
K. Xue, Y.Q. Li and H.F. Wang	327
Manufacturability of Sheet Metal Design with the Help of Product Data Management (PDM)	
M. Huhtala, M. Lohtander and J. Varis	331
Disassembly Sequence Planning of Steam Turbines for Virtual Maintenance	
H.T. Zhu and L. Cong	335
Disassembly Sequence Planning Based on Poisoning Ant Colony Algorithm	
W.L. Wang and X.J. Shi	340

VI. Gearing, Mechanical Transmission and Mechanisms

Problem Analysis of Conoprobe in Gear Measurement Application	
J.S. Liu and J. Qian	347
Optimal Tooth Surface Modifications in Face-Hobbed Hypoid Gears	
S. Vilmos	351
Computerised Tooth Profile Generation of Conjugated Involute Internal Gears	
C. Fetvaci	355
On Strain of Gear Meshing Thermo-Mechanical Coupling	
Y.M. Hu, F.J. Zhang and Y.M. Shao	359
Prediction of Heat Generation and Temperature Distribution in High Speed Preloaded Ball Screws	
A. Oyanguren, I. Ulacia, J. Larrañaga, A. Gallo, A. Arana and R. González	363
Implications of Contact Parameters on the Dynamics of Chain Drives	
C. Pereira, J. Ambrósio and A. Ramalho	367
Development of Friction Properties Experimental Device of Mechanical Seal Material in Vacuum Working Condition	
F. Zhang, B.Y. Song, J.P. Sun and S. Zhang	371
Study on the Tribological Properties of PTFE-Based Composites Materials Sliding Pair under Extreme Environment	
F. Zhang, T.Y. Sui, B.Y. Song and Y. Cao	375
The Effect of Bearing Surface Finish on Engine Performance	
K.D. Nyamugure, D. Cheshire and A.H.C. Barber	380

The Research on Oil-Air Lubrication in Grooved Sliding Bearing J.L. Wang, L.Q. Li and S.G. Liu	384
Shear Traction and Sticking Scope of Frictional Contact between Two Elastic Cylinders Y.P. Zhao, Q.B. Wang and Y.M. Zhang	388
The Research on Oil-Air Lubrication and Oil Lubrication in the Sliding Bearing L.Q. Li, S.G. Liu and J.L. Wang	393
The Research on the Lubricating Property of Oil-Air Lubrication in the Sliding Friction Element S.G. Liu, L.Q. Li and J.L. Wang	397
The Application of Improved Cyclical Spectrum Density Method in Fault Diagnosis of Rolling Bearing M. Li, X.J. Wang and J.H. Yang	401
Dynamic Synthesis of Adaptive-Mechanical CVT K.S. Ivanov, G. Ualiev and B. Tultaev	405
Investigation of the Operational Behaviour of Wide V-Belts in CVT Applications F.H. Schaefer	413
On the Development of a Manipulator Type Parallelogram 3-DOF for the Optimization Trajectory V.H. López Enríquez, V. Granados Alejo, R. Martín Del Campo Vázquez and F.J. Santander Bastida	417
The Vibration Modeling and Analysis of Stewart Platform-Based Machine Tool X.J. Yang, G.L. Sun and B. Li	421
Design and Analysis of a Novel 5 Dimensional Active Vibration Isolator with Parallel Mechanism J.K. Liu, S. Wang, B. Li and Y. Hu	425
Analysis and Simulation of Deployable Modularized Truss Mechanisms G. Li, Z.Q. Deng, X.Z. Qi, B. Li and R.Q. Liu	429
Mechanism Design and Modal Analysis of Vertical-Axis Tidal Turbine W.D. Zhao, Y. Li and Y.T. Li	433

VII. Machine Condition Monitoring

An Ensemble Dynamic Time Domain Averaging Method for Gear Fault Detection without Tachometer H.F. Xiao, X.J. Zhou and Y.M. Shao	439
Diagnosis of Low-Speed Helical Gears Based on Hilbert Demodulation and Empirical Mode Decomposition B.Y. Song, Z.J. Xie, F. Zhang and J.P. Yang	443
Prophase Failure Prediction of the Mechanical Transmission Systems Based on the Biological Evolutionary Algorithm X.H. Chen, L. Xiao, Z.X. Liu and C. Liu	447
An Energy-Efficiency Wireless Sensing Method for Mechanical Failure Signal X.M. Liu, S. Han, Y.J. Zhou and Y. Yao	451
A Time-Efficiency Multi-Channel MAC Protocol for Wireless Sensor Networks S. Han, X.M. Liu, Y. Yao and Y.J. Zhou	455
Cold Rolling Strip Off-Tracking Online Monitoring Method via Wireless Sensor Network with Self-Powered Nodes J.H. Yang, M. Li and K.H. Huang	459
Experimental Research on the Feature Extraction of Underwater Transient Signal S.J. Sun and Y. Li	463
Investigating the Design of Condition Monitoring Systems to Evaluate Surface Roughness under the Variability in Tool Wear and Fixturing Conditions J. Abbas, A. Al-Habaibeh and D.Z. Su	467
Coupling Effect between Gear Backlash of Friction Plate and Axial Separation Gap in Multi-Friction Pairs S.L. Li, J.L. Pan and X.Y. Zhao	471
Research on the Optimization Method of the Friction Plate Backlash S.L. Li, L. Gao and H. Zhang	476

Analysis of Vibration Characteristics of Friction Plate Based on Rigid-Flexible Coupling Model	
S.L. Li, J.L. Pan and H.B. Yin	480
A Method of Chatter Marks Identification Based on Autocorrelation-Threshold	
L.M. Wang, Y.L. Yuan and Y.M. Shao	485
An Exact Series Solution for the Vibration of Mindlin Rectangular Plates with Elastically Restrained Edges	
K. Xue, J.F. Wang, Q.H. Li, W.Y. Wang and P. Wang	489
Intelligent Design and Control of Outdoor Lighting, Complexity Issues	
I. Wojnicki and L. Kotulski	494

VIII. Finite/Boundary Element Methods

Strength Analysis of the Static Load Test Frame Based on ANSYS Workbench	
G.J. Li, C.M. Yan and A. Luo	501
Analysis of Functionally Graded Rectangular Plate by ANSYS	
W.M.K. Helal and D.Y. Shi	505
Dynamic Analysis of T-Shaped Plate with General Boundary Conditions	
D.Y. Shi, Q.S. Wang and X.J. Shi	509
Fatigue Life Analysis of Wire Rope Strands with Finite Element Method	
I. Gerdemeli, S. Kurt and A.S. Anil	513
Design and Finite Element Analysis of Gantry Crane	
I. Gerdemeli and S. Kurt	517
Modal Analysis on 600 Wh Energy Storage Flywheel Rotor System	
Z.Y. Ren, J.N. Liu, Y.J. Han and W.Q. Teng	521
FEM Analysis of Helical Rolling of Steel Balls	
Z. Pater	525
Analysis of Instability for the String-Net Structure in the Deployable Antenna	
A. Luo, H.P. Liu, Y.F. Wang, J.H. Song, W.T. Ma, W.J. Mao and Q.F. Zeng	529

IX. Optimisation, Simulation and Computing Technologies

Epistemic and Methodological Challenges of Dynamic Environmental Assessment: A Case-Study with Energy Production from Solar Cells	
B. Laratte and B. Guillaume	535
Classification of Mutation Operators Applied to Design Models	
J. Strug	539
Mutation Testing Approach to Evaluation of Design Models	
J. Strug	543
Research on Evolutionary Topology Optimization in ANSYS	
D.Y. Shi, J.S. Han, L.C. Kong and L. Lin	547
Multi-Object Multi-Discipline Probabilistic Design of High-Pressure Turbine Blade-Tip Radial Running Clearance	
W.Z. Tang, C.W. Fei and G.C. Bai	551
Simulation Study on Feed Rate Optimization Technique Based on Generalized Predictive Control	
X. Li, H.B. Liang and S.Z. Zhang	555
Standardising Academic Transfer Tool: Converting Curriculum Documents to XCRI Format Using UML	
Y.J. Zheng, P. Alcover, C.C. Maia and T. Awoniyi	559
Curriculum Design within a Semantic Information System	
Y.J. Zheng, G. Dafoulas, G. Abeysinghe and C.C. Maia	562
Research and Implementation of an Improved Canny Edge Detection Algorithm	
D.D. Han, T.C. Zhang and J. Zhang	566
Recognition and Extraction of Debris Parameters in Traffic Accident Picture	
X.J. Du and H.H. Guo	570

Simulation of Pedestrian Colliding with Microbus Windshield X.J. Du and J.P. Li	574
New Virtual Application for Improving the Students' Understanding of Ternary Phase Diagrams D. Vergara, M.P. Rubio and M. Lorenzo	578
Interactive Virtual Platform for Simulating a Concrete Compression Test D. Vergara, M.P. Rubio and M. Lorenzo	582

X. Manufacturing Informatics

Advanced Design Optimisation by Means of Multiobjective Evolutionary Algorithms: The Case of Two Real World Applications E. Benkhelifa, A. Tiwari and M. Abdel-Maguid	589
Locator Layout Optimization for Checking Fixture Design of Thin-Walled Parts X.H. Zhou, W. Liu, Q. Niu, P. Wang and K. Jiang	593
A Sugeno-Type Fuzzy Expert System for Rough Turning J. Ratava, P. Luukka, M. Lohtander and J. Varis	597
Façade Optimisation Using a Point Equilibrium Methodology D. Cheshire, R. Edmondson and P. Savidge	601
The Capability of the Laser Based Additive Manufacturing Process in the Manufacture of Fractal like Heat Transfer Devices M. Lohtander, S. Valkeapää and J. Varis	605
Monitoring and Digitising Human-Workpiece Interactions during a Manual Manufacturing Assembly Operation Using Kinect™ V.A. Prabhu, A. Tiwari, W. Hutabarat and C. Turner	609
Numerical Simulation and Optimization of Drill Pipe - Martian Soil Model H.W. Xue, Z. Song, J.F. Zhang, S.Y. Jiang and B. Li	613

XI. Robots and Control

The Analysis and Control of Exoskeleton Upper-Limb Rehabilitation Robot L. Wang, Z.Q. Yin and Y.H. Sun	619
A New Design of Climbing Robot with TRIZ Theory Y.X. Huang, L.C. Kong and W.T. Liu	624
Study on a New Type of Clearing Stump Robot X.L. Guo and Y.G. Wang	628
Longitudinal Associated Stability Analysis of Mobile Robot in Rough Terrain M. Bai, H. Xu, L. He, W.X. Guo and C.H. Qiu	632
Walking Stability Analysis of Multi-Legged Crablike Robot over Slope X. Chen and G. Wang	636
Track Link-Terrain Interaction Simulation Based on Terramechanics G.B. Li, L. Dai, M.H. Xu and F.Y. Shi	640
Design and Implementation of a 3D Range Scanner for Mobile Robots G. Aslan, E.I. Konukseven and B. Koku	644
Integrated Approach for Multi-Robot Spot-Welding Cell Design and Welding-Point Allocation S. Pellegrinelli, N. Pedrocchi, L. Molinari Tosatti and T. Tolio	648

XII. Engineering Management and Enterprise

Effective Management of Engineering Projects using 4Es Model G. Agyekum-Mensah, A. Knight, C. Pasquire and C. Coffey	655
Pricing and Emission Reduction Strategy of Manufacturer with Carbon Emission Constraints in Low Carbon Supply Chain X. Liang, Y. Xiong, Y.Z. Hou and S.M. Xia	659

Emissions Reduction Cost-Sharing Contract through Green Innovation under Carbon Emission Constraints X. Liang and Y. Xiong	663
Price and Carbon Emissions Level Decisions in a Two-Echelon Supply Chain: Insights from Carbon Labelling Y.H. Cheng, Z.K. Xiong and Y. Xiong	668
Analysis of the Barriers to Environmental Management Systems Implementation in the Libyan Oil Industry A. Irhoma, D.Z. Su and M. Higginson	672
When Does the Trust Prohibit the Technology Transfer between Two Manufacturing Firms? A Perspective of Transaction Cost Economics S.M. Xia, Y. Long and Y. Xiong	678
Relationship between Technology Standards and Technology Spillovers Effect of Foreign Direct Investment Based on Product Life Cycle X. Liu, Z.Y. Huang and S.M. Xia	682
Study of Technology Spillovers Effect with Foreign Direct Investment Based on Technology Standards X. Liu, Z.Y. Huang and Y.Y. Chen	686
A Review of Problems Faced by ERP Consultancy and Client Organizations in China J.C. Hou	690
Rebuild Technology Transfer in the Presence of Remanufacturing Dealer J. Cao, Y. Xiong and Y.Y. Chen	695
Remanufacturer-Manufacturer Collaborative Model in the same Channel under Three Channel Power Structures K. Wang and Y. Xiong	699
The Adaptability of Products to E-Commerce: Transaction Cost Economics Perspective Y. Long, S.M. Xia, Y. Xiong and X. Liang	703