Table of Contents

Preface, Committees and Sponsors

Chapter 1: Science and Technology of Materials

Spatial Trajectory Size V. Shcherbakov, M. Korytov, E. Volf and I. Breus

Change of Thermo-Mechanical Properties of Optical Fibers Aged in CTAC Aqueous Solution	
R. El Abdi and A. Dumitrache Rujinski	3
Experimental Study towards Heterogeneous Welded Joint, Case Study: Welding Joint of Carbon Steel S235JR + AR with Stainless Steel 316L M.C. Dijmărescu, D.T. Cicic, C. Rontescu, G. Solomon and M.I. Vasile	9
Investigation of Wear Properties of EBM Processed Ti6Al4V with UHMWPE for Biomedical Applications A. Mohammadhosseini, D. Fraser, S.H. Masood and M. Jahedi	14
Investigation of some Intrinsic Properties of Thermal Sprayed Molybdenum Coatings for Railway Axle Applications G. Matache, C. Puscasu, A. Paraschiv and O. Trusca	19
Experimental Research Based on the Technological Parameters Influence at the Interface Material - Layers Deposited C. Boboc	24
About the Calculus of Fatigue Resistance to Limited Durability for Thermoplastic Polyurethane Membrane M. Sugin, M.S. Tripo, L. Chielton and D. Pouneseu.	29
M. Suciu, M.S. Tripa, L. Ghioltean and D. Paunescu Modeling and Simulation of the Sulfur Dioxide Adsorption Process in Natural Zeolites S. Sfechiş, M. Abrudean, D.M. Sas, M.L. Ungureşan, I. Clitan and V. Mureşan	35
Chapter 2: Tools and Processing Technologies in Mechanical Engineering	
Decrease in Power Consumption of Hydraulic Systems of Modern Machine Tools D. Prodan, A. Bucuresteanu, A. Motomancea and E. Balan	45
Transitory Dynamics Evaluation inside Driving System of Demolition-Cutting Technological Equipment due to Variable Tool-Material Interactions S. Nastac, C. Debeleac and C. Simionescu	50
Study for Improving Laser Beam Welding Efficiency R. Ciobanu, O. Donţu, D. Besnea, A. Spanu and I. Avarvarei	57
Increasing Performances in High Pressure Casting Process of Aluminium Alloys E.M. Galitu and G. Constantin	63
Influence of Non-Stationary Thermal Field on the Hardness of Welded Samples N. Grigore	75
Determining of the Wear Traces for Sliding Couplings I.C. Petre and C.A. Cîrstoiu	80
Graphical Method in CATIA to Profile the Hob Mill for Generating the Slitting Saw Cutter Teeth G.R. Frumuşanu, V. Teodor and N. Oancea	85
Finite Element Analysis for Deep Drawing Process and Part Shape Optimization I. Iordan, C. Dogariu and C. Mohora	92
Chapter 3: Designing, Modeling and Optimization of Manufacturing Machines and Mechanisms	
The Reduction of Errors of Bridge Crane Loads Movments by Means of Optimization of the	

99

(T, I, F)-Neutrosophic Structures F. Smarandache	104
Considerations on the Vibratory Motion of a Medical Electro-Mechanical Equipment	104
C. Dragomirescu and V. Iliescu	110
The Effects Produced by a Butterfly Valve in a Hydraulic Closed Circuit L. Mândrea, C. Cipu, C. Băbuțanu and G. Oprina	117
A Method to Increase the Natural Frequency of a Ground Moving System D. Turcanu, I. Nicola, T. Prisecaru and C. Predoi	122
Global Analysis of Tip Clearance Influence on Centrifugal Compressor Performance V. Dragan, B. Gherman, I. Mălăel and R. Bimbasa	128
Modeling and Simulation of a Hydroelectric Process V. Mureşan, M. Abrudean, T. Colosi, C. Bondici, I. Clitan, M.L. Ungureşan and M. Secară	133
Chapter 4: Advanced Research of Aerospace and Astronautics Systems	
Influence of Exhaust Nozzle Geometry on the Jet Potential Core Development D.E. Crunteanu, V.I. Misirliu, O. Dumitrescu and B. Gherman	145
Inviscid Nozzle for Aerospike Rocket Engine Application A. Bogoi, R.D. Rugescu, V.I. Misirliu, F.R. Bacaran and M. Predoiu	152
Aspects Regarding the Performances of Small Swept Flying Wings Mini UAV-s in Aggressive Maneuvers V. Prisacariu, M. Boşcoianu, I. Cîrciu and R. Lile	157
On the Supersonic Combustion of Hydrogen around a Conical Obstacle Considering Variable Specific Heats with Application to Scramjets S. Berbente, D.E. Crunteanu and C. Berbente	162
Aircraft Engine Combustion Chamber Performances-Numerical Evaluation I. Cîrciu, C. Rotaru, D. Luculescu and C. Constantinescu	167
Fuzzy Control of a Quadrotor for Reconstructed States Feedback Using Multiobserver L. Ramírez, M. Zúñiga, G. Romero, D. Lara, A. Rabhi and C. Pegard	172
A Mixed H ₂ /H _{\infty} Jump Markovian Design Approach for the Automatic Flight Control System of an Unmanned Airship	-,-
A.M. Stoica and L. Mujdei	179
Chapter 5: Advanced Research of the Sensors, Measurement Technologies and Mechatronic Systems	
Low Cost Irrigation System for Domestic Crops Based on Arduino Uno and LabView V.A. Flores, W.E. Rodríguez, A.J. Rodríguez, E. Jaime, O. Martínez and M. Zúñiga	189
Numerical Simulation Method for Velocity Sensors Calibration in High Speed Flows L.A. Stika, M. Boşcoianu, V.A. Vilag and I. Porumbel	194
Improving Driver Comfort with Linear Quadratic Controller for Active Suspension System I. Borozan, F. Cosco and V. Argesanu	199
Optimizing the Design of a Magnetic Actuator for Scanning and Energy Harvesting MEMS Devices	
C.D. Comeagă, C. Necula and O. Donțu Error Modeling and Calibration of MEMS-Based IMUs Including Accelerometers and	204
Gyroscopes A. Fatin and A. Banazadeh	210
Estimate of Color Depth Discretization Impact on the Accuracy of an Ideal Pinhole Camera R. Mirescu and G. Roca	217
The Study of an Electric Circuit of Force-Based Electrodynamic Energy Harvesting Device C.D. Comeagă, A.M. Mîţiu and V. Gheorghe	222
Application of the Fatigue Crack Opening/Closing Effect for SHM Using Electromechanical Impedance Technology V. Pavelko	220
Spectral Monitoring of the Crops Vegetation Status in Precision Agriculture	228
M.C. Luculescu, L. Cristea, S.C. Zamfira and I. Barbu	236

Contributions to Hydrogenerator Protection when its Running in the Motor Regime is Detected D. Purcaru and A. Purcaru	241
Modification of Space Truss Vibration Using Piezoelectric Actuator S.M.N. Mehrian and S.Z. Mehrian	246
Active Static Balancing of Mechatronic Systems - An Overview L. Ciupitu	253
Chapter 6: Advanced Research in Robotics	
Velocity Characteristics of Movement of Chassis with Special Wheels for Overcoming Stairs Z. Bobovský, V. Krys, T. Kot and V. Mostýn	263
Special Wheels for Overcoming Stairs V. Krys, Z. Bobovský, T. Kot and V. Mostýn	268
Bi-Mobile Leg Mechanism Dynamic Model A. Comanescu, D. Comanescu, I. Dugaesescu and L.M. Ungureanu	273
Gripper with Average Continuous Reconfigurability for Industrial Robots S. Jitariu and I. Staretu	279
Dynamic Modeling and Simulation of a 4-Wheel Integral Steering Vehicle C. Alexandru	284
Proper LabVIEW Instrumentation of the Robot's Kinematics and Dynamics Behavior A. Olaru, S. Olaru, N. Mihai, T. Mikolajczyk and D. Bardac	291
Path and Trajectory Planning for Vehicles with Navigation Assistants T. Gîrbacia, A. Margarit, S. Mădălin and G. Mogan	300
Upper Limb Exoskeleton Controlled by Stepper Motor T. Mikolajczyk, A. Olaru and P. Walkowiak	305
The Role of Motion Planning in Robotics E. Masehian	311
Structural, Kinematic and Static Modelling of a Pneumatic Muscle Actuated Gripper System	
T. Deaconescu and A. Deaconescu	318
The Experimental Analysis for the Localization of a Mobile Platform Equipped with a Multi-Antenna GNSS System R. Ghelmeci	323
Chapter 7: Renewable and Unconventional Energy	
Numerical Simulation of a Vertical Axis Wind Turbine for Urban Use I. Mălăel, L. Moutet and V. Dragan	333
RES Storage Solution for Clean Electrification of Passive House G. Badea, R.A. Felseghi, S. Răboaca, I. Aşchilean, A. Bolboacă, D. Mureşan and T. Şoimoşan	339
Chapter 8: Biomedical Engineering	
Instrumented Gait Analysis for Assessing the Efficiency of a Complex Rehabilitation Program in Patients with Stroke – A Case Study N.A. Cojan Carlea, R.I. Badea, A.N. Iliescu, I. Ciobanu and M. Berteanu	347
Development of a Wearable Scoliosis Monitoring System Using Inertial Sensors G.D. Voinea and G. Mogan	353
Cytostatic Solution's Flow Control for a Hyperthermic Intraperitoneal Chemotherapy Device	
I. Clitan, M. Abrudean, V. Mureşan, D. Moga and C. Lungoci	359
Modeling and Simulation of an Orthodontic Process O. Nemeş, V. Mureşan and T. Coloşi	365

Chapter 9: Advanced Decisions in Engineering Management

Analysis of Reliability Aspects of Railway Accident Precursors: An Italian Case Study	
F. de Felice, A. Petrillo and F. Zomparelli	373
Optimization of Transportation for Hazardous Waste Disposal from Medical Units M. Debita, C.L. Musat, M. Rus, E. Mereuta and C. Mereuta	378
Massive Cyber-Attacks Patterns Implemented with BDI Agents H. Moga, M. Boşcoianu, D. Ungureanu, R. Lile and N. Erginoz	383
A Statistical Review on the Decision about the Fighter Pilot's Ejection Inromanian Air	
Force A. Gheorghiu and M. Boşcoianu	390
Diversification of Water Network Tanks Volume	
J. Rak and K. Pietrucha-Urbanik	395