

# Table of Contents

## Preface, Scientific Committee and Sponsors

## Chapter 1: Aerospace Engineering

<b>Transient Induced Delay in the Check Injector of the ADDA Combined Rocket Motor</b> R.D. Rugescu, G. Calcisca and D.R. Rugescu	3
<b>The Test Stand for ORVEAL Series of Combined Rocket Engines</b> R.D. Rugescu, R. Sapunaru and D.R. Rugescu	10
<b>L<sub>1</sub> Controller Design for a Flying Wing Unmanned Aerial Vehicle</b> A.M. Stoica	18
<b>Aerodynamic Noise Control Study of Nozzles with Triangular Chevrons</b> G. Cican and D.E. Crunteanu	25
<b>Applications of Real Options Analysis in Aviation Security Investments</b> C. Cioaca and M. Boşcoianu	32
<b>An Innovative CubeSat Power System</b> M. Totu	40
<b>ADDASAT Development Plan for the Attitude Control System</b> R.D. Rugescu, M.A. Barbelian and E. Micu	47
<b>Comparison of Controllers for a UAV with Integral Effect and Kalman Estimator: By Bessel Polynomials and LQR</b> W.E. Rodriguez, R. Ibarra, G. Romero, D. Lara, J. Arredondo, J.G. Rivera and C. Pegard	54

## Chapter 2: Mechanical Engineering and Materials Engineering

<b>Creation of Adaptive-Mechanical Continuously Variable Transmission</b> K.S. Ivanov	63
<b>Gear Mechanism with Force Differential Constraint</b> K.S. Ivanov and B. Tultaeu	71
<b>Consequences of Electrical Arc on Automotive Connector during Extraction Phase</b> R. El Abdi, E. Carvou and N. Benjemâa	80
<b>Assisted Research of the Centrifugal Pump's Vibration Behavior</b> D.F. Niculescu, A. Olaru, A.L. Ghionea, M. Hajduk and M. Vagaş	85
<b>Two Dimensional Analysis of Functionally Graded Partial Annular Disk under Radial Thermal Shock Using Hybrid Fourier-Laplace Transform</b> S.M. Nowruzpour Mehrian and M.H. Naei	92
<b>Modeling and Simulation in Virtual Prototyping Environment of a Photovoltaic Tracking System</b> C. Alexandru	100
<b>Crack Path Investigation Using the Generalized Maximum Tangential Stress Criterion: Antisymmetrical Four-Point Bending Specimen</b> L.Š. Malíková	108
<b>Investigation of Microstructure and Mechanical Properties of Carbon Steel Wire after Continuous Method of Deformation Nanostructuring</b> M. Polyakova, A. Gulin and D. Konstantinov	114
<b>A Simplified Method for Wear Loss Prediction in Corrosive Environment</b> Z. Doni, M. Buciumeanu and L. Palaghian	121
<b>Analogical Modeling and Numerical Simulation for Sintering Phenomena</b> C. Bokor, V. Mureşan, T. Nemeş and C. Isarie	127
<b>Elements of Design and Dimensioning of Hydraulic System with Secondary Control</b> L. Topliceanu, A.S. Ghenadi and L. Bibire	137
<b>A Proposed Control Technique for Water Management in Proton Exchange Membrane Fuel Cells</b> A.C. Farcaş	145

<b>The Screening of Phthalic Acid Esters in Operating Fluids of Vehicles</b> S. Cornak and A. Jarosova	153
<b>The Control of Vibration Transmissibility Using an Electrodynamic Actuator – Passive Solution</b> A.M. Mițiu, D.C. Comeagă and O.G. Donțu	158
<b>The Control of Vibration Transmissibility Using an Electrodynamic Actuator –Close-Loop Solution</b> A.M. Mițiu, D.C. Comeagă and O.G. Donțu	166
<b>The Specific Aspects of Fuel Assessment by Fingerprint Method</b> S. Cornak	174
<b>Theoretical Considerations about the Influence of the Work Environment and of Mixer Hydrodynamic Mass on the Deformations and Implicitly on the Shaft Own Pulsation</b> L. Bibire, A.S. Ghenadi and L. Topliceanu	180
<b>Hydraulic System of Braking Energy Recovery for Heavy-Duty Machine-Tools. Mathematical Models. Simulation</b> D. Prodan, A. Bucuresteanu and E. Balan	188
<b>The Influence of the Cutting Speed and Feed Rate on the Machinability Ratings in Machining of AISI 1045 Carbon Steel and AISI1MgMn Aluminium Alloy</b> N. Lungu, S.M. Croitoru, C.F. Bîu, C. Dumitrașcu and M. Borzan	194
<b>Research on Vibratory Behavior Assessment and Maintenance of Drilling and Threading Machine VA20A</b> M. Hajduk, D.F. Niculescu, A. Olaru, M. Vagaș and A. Ghionea	205
<b>Comparative Study on Determining the Drilling Force Regression at Drilling Composites Materials</b> C. Ocnărescu, D. Bardac and M. Ocnărescu	213
<b>Contributions Regarding the Possibility of Increasing the Milling Process Efficiency</b> C. Gelmereanu, S. Bogdan and L. Morar	219
<b>Evaluation and Improvement of the Spindle Thermal Transfer</b> E. Udup, C.F. Bîu and M. Zapciu	225
<b>The Determination of Dissolved Oxygen Concentration in Stationary Water</b> I.M. Călușaru, N. Băran and A. Costache	233
<b>Numerical Simulation Concept of a Magnetron Discharge</b> S. Ionut and S. Eugen	238

### **Chapter 3: Biomechanics**

<b>Elements of Gait Kinematic Analyze in CAMONAL Project</b> M. Berteanu, P. de Hillerin, R. Bidiugan, I. Ciobanu, R. Badea, L. Dumitru, A. Iliescu and H. Dinu	247
<b>Comparative Study of Two Different Types of Human Mandible Boundary Conditions Used in Finite Element Calculations</b> J. Valášek, M. Jurčenko and Z. Florian	255
<b>Concept and Procedure for Measuring Anaerobic Motricity in Taekwondo</b> C. Păunescu, G. Gagea, M. Păunescu, G. Pițigoi and S. Petrescu	265
<b>Oscillatory Movements Analysis at Knee Level</b> M.I. Baritz and D.L. Cotoros	271
<b>Using AutoCAD Application as Instrument for Biomechanical Assessment of Orthopedic Impairments</b> I.C. Raveica, C. Mohora, G. Raveica and A.E. Pena	277

### **Chapter 4: Measurement and Technical Diagnostics**

<b>Time Domain Bearing Diagnosis Using Kurtosis Based Filtering and Fuzzy Logic</b> B. Betea and L. Tomesc	287
<b>Use Measurement System Analysis in Order to Reduce the System Variation</b> C. Ile and G. Lazea	295

<b>On Approaches of Assessment of Tribo Data from Heavy Tracked Vehicle</b> D. Valis, L. Zak, A. Walek and J. Glos	303
<b>Analyze the Process Capability: A Case Study</b> C. Ile	311
<b>An Analytical Approach Regarding Some Radiometric Problems during the Detection on the Sea Surface with a Thermal Camera</b> C. Spulber and O.V. Borcan	318
<b>A Contribution to the Estimation Problem of the Detection Performance with a Thermal Camera in Different Conditions of Meteorological Visibility</b> O.V. Borcan and C. Spulber	326

## **Chapter 5: Robotics, Automation and Smart Systems Applications**

<b>Research on Actuators Optimization via PID Closed Control Algorithm for Video and Photo Cameras Stabilization</b> M. Mănescu, L. Cristea, B.C. Braun and D. Ola	337
<b>Design and Evaluation of the Unmanned Technology Research Centre Exoskeleton (UTRCEXO)</b> D.W. Cha, S.N. Oh, K.H. Choi, K.I. Kim, K.S. Kim and S.H. Kim	345
<b>Design of Modular Gripper for Industrial Robot</b> M. Vagaš and J. Varga	351
<b>Optimization of the Accuracy of Automotive Parking for the Car-Type Mobile Robot</b> M.K. Sarangi, D. Pati, A. Parida, A. Mohanty and O.I. Bylya	358
<b>Study of the Workspace of Hybrid Mechanism Trivariant</b> V. Bulej, J. Uriček, V. Poppeova, R. Zahoranský and M. Rupikova	366
<b>Methodology of Developing Mathematical Models with Fuzzy Logic Elements for Quality Indices Control</b> A. Korchunov, M. Chukin and A. Lysenin	374
<b>Model of Mechatronics Robots Tool with Controlled Geometry</b> T. Mikolajczyk, Ł. Romanowski and S. Sojka	382
<b>Design and Control System of Parallel Kinematic Manipulator</b> T. Mikolajczyk, D. Dorsz and Ł. Romanowski	390
<b>Automatic Control System for Gas Turbines Test Rig</b> G. Dediu and D.E. Crunteanu	398
<b>Automatic Control of the Driving of Loading-Unloading Machines Used for Servicing a Rotary Hearth Furnace</b> V. Mureșan and M. Abrudean	406
<b>Household Water Tank Temperature Control</b> I.V. Sita, P. Dobra, M. Dobra and V. Mureșan	417
<b>Numerical Sliding Mode Control for a DC-DC Buck Converter</b> L. Tomesc and B. Betea	427
<b>Universal Communication Node for Building Automation Systems</b> I.V. Sita and P. Dobra	435
<b>Adaptive Control System for Drill Machine</b> T. Mikolajczyk, A. Olaru and P. Krainiski	445
<b>An Agent Infrastructure For the Human Driver Assistant</b> E. Diaconescu, A. Mihai and L. Vladareanu	451

## **Chapter 6: Applied Mathematics and Information Technologies**

<b>Software Application in Machine Vision Investigation of Agricultural Seeds Quality</b> D. Ola, M. Mănescu, L. Cristea, J. Budde and T. Hoffmann	463
<b>Developing an Interface for a Research Program</b> S. Eugen and S. Ionut	474
<b>Quality Modeling Framework for Service Composition. An Indoor Air Quality Monitoring System Case Study</b> G. Stegaru, M. Moisesescu, I.S. Sacala and A.M. Stanescu	480

<b>Semantic Middleware Architecture</b> D. Repta, I.S. Sacala, M. Moisesescu and A.M. Stanescu	488
<b>A Holistic Vision of Medical Services and Information Support System Based on E-Healthcare Framework</b> N. Costetchi, A.M. Stanescu, M. Moisesescu and I.S. Sacala	497
<b>Reliability Allocation for a System with Complex Redundancy</b> Z. Vintr and T. Vintr	505
<b>Correlation Coefficient of Interval Neutrosophic Set</b> S. Broumi and F. Smarandache	511
<b>Optimal Solving of the Contradictory Problem between Hydraulic Cylinder's Precision and Stability with Extenics Theory</b> A. Olaru	518
<b>Blur Kernel Optimization: A New Approach to Patch Selection with Adaptive Kernel Estimation</b> S. Yousaf and S.Y. Qin	531
<b>Contribution to Diffusion Processes Application in the Area of Critical Infrastructure Security Assessment</b> D. Valis and K. Pietrucha-Urbanik	539

## **Chapter 7: Engineering Management**

<b>Procurement Approaches in Different Supply Chains</b> S. Pap and L. Morar	551
<b>Evaluation of Product Reliability during Warranty</b> Z. Vintr and M. Vintr	557
<b>Research Regarding the Aspects that Determine Employees to Adopt a Work Performance-Oriented Behavior</b> V. Firescu	563
<b>Flexible Integration of Enterprise Resources Planning in the Case of Roumanian Public Reasearch and Development Strategy</b> M. Boşcoianu and E.C. Boscoianu	571