# Table of Contents

Preface, Committee and Sponsors

**Chapter 1: Aerospace**

**Nonlinear Dynamic Modeling and Simulation of an Insect-Like Flapping Wing**  
A. Banazadeh and N. Taymourtash  
3

**Model of Assessing the Impact of Rare Events in Aviation Security Investments Projects**  
C. Cioaca and M. Boscoianu  
11

**CFD Analysis of Scramjet Combustor with Non-Premixed Turbulence Model Using Ramp Injector**  
K.M. Pandey and S. Roga  
18

**Development of Spherical Ultrasonic Motor for Space**  
T. Oohashi and S. Toyama  
26

**Modelling and Simulation of Suborbital Launcher for Testing**  
T.V. Chelaru, V. Pana and A. Chelaru  
32

**Comparison of Controllers for a UAV Type Quadrotor: Feedback Control by Bessel’s Polynomials and LQR with Kalman Filter**  
W.E. Rodríguez, R. Ibarra, G. Romero and D. Lara  
40

**Conflicting Design Issues Hallmark the Compound Rocket Motors**  
R.D. Rugescu  
49

**A New Kalman-Type Approach for Satellites Attitude Determination**  
A.M. Stoica  
57

**Advanced Strategic Planning and Capability Identification in Order to Develop a Liquid Hydrogen Turbopump**  
66

**On the Hybrid Combustion Instability**  
D. Sterian and C. Leventiu  
72

**A Global Study of the Performances of a New Turbofan Configuration**  
R.M. Catana and G. Cican  
78

**Performances Study of Liquid Rocket Engine**  
G. Cican, D.E. Crunteanu and M.Y. El Azzioui  
84

**Orbital Launcher NERVA as the First Proof of the Discontinuous Variational Solution for the Atmospheric Ascent**  
R.D. Rugescu, R.D. Rugescu and E. Micu  
91

**Combustion of Camelina Oil – Kerosene Mixtures in a Micro Gas Turbine**  
A.C. Petcu, C. Sandu and C. Berbente  
102

**Aerodynamic Characteristics of NACA 23015 Landing Configuration with 20° Flap in Simulated Rain**  
S. Latif, Z. Hong and M. Ismail  
108

**Longitudinal Control System Design Using Gradient Method for a Suborbital Launcher**  
T.V. Chelaru, V. Pana and A. Chelaru  
113

**Theoretical and Numerical Approaches for Calculating the Performances of an Industrial Turboshaft**  
J.A. Popescu, V.A. Vilag, C.F. Cuciumita and V. Silivestru  
121

**Chapter 2: Robotics and Mechatronics**

**Pneumatic Muscle Actuated Rotation-Translation System**  
A. Deaconescu and T. Deaconescu  
129

**Proper Assisted Research Method Solving of the Robots Inverse Kinematics Problem**  
A. Olaru, S. Olaru and N. Mihai  
135

**Control of Articulated Manipulator Model Using ATMEGA16**  
T. Malinowski, T. Mikolajczyk and A. Olaru  
147
Model of Human Hand Controlled Using Pneumatic Muscles
T. Mikolajczyk, K. Bednarczyk and A. Mikolajczyk

CBRNE Fluids Sampling Subsystem for Mobile Robot
M. Gloger, P. Novák and V. Krys

Analysis of the Accuracy and Robustness of Kinect Sensor Used with the Scope of Robot Manipulation
C.C. Moldovan and I. Staretu

The Synthesis and Testing of a Shaped Wheel for Stairs Climbing Robot
V. Krys, V. Mostýn and T. Kot

Improvement of Accuracy to Grind by Changing Position Control Gain for Shape-Grinding
M. Minami, K. Adachi, S. Sasaki and A. Yanou

Bezier Curve Based Programmed Trajectory for Coordinated Motion of Two Robots in Cartesian Space
A. Slota

Utilization of the Oculus Rift HMD in Mobile Robot Teleoperation
T. Kot and P. Novák

Controlled Arming of Mechanical Systems Embedded into Embarked Electrical Systems
G. Negru

Development of Gun Turret Drive Stabilization System with a Microcontroller and Implementation on a Model Tank
H. Kuscu and S. Songul

PID Control System for a Distributed Parameter Process
M.L. Ungureșan and V. Mureșan

New Solution of Walking Robot
T. Mikolajczyk, T. Fas, T. Malinowski and L. Romanowski

A Comparative Study on Geometric and Kinematic Parameters of Serial (4R) and Parallel (3T) Robots
C. Ocnărescu, I. Simionescu, V. Vulturescu and M. Ocnărescu

Reduced Base Fuzzy Logic Controller for Robot Actuators
V. Vladareanu, P. Schiopu, S. Cang and H.N. Yu

An Experimental Framework for Multi-Agents Using RTOS Based Robotic Controllers
C. Spirleanu, L. Vladareanu and E. Diaconescu

The Dynamic Behavior of the Rotational Mechanism of One Transfer Manipulator with Electro-Hydraulic Acting
C. Cristescu, C. Dumitrescu, L. Dumitrescu and I. Ilie

Kinematic and Force Analysis of Robot with Adaptive Electric Drives
K.S. Ivanov, G. Ualiev and B. Tultaev

Design of Neural Network Controllers for the Horizontal Positioning of an Industrial Manipulator
I. Clitan, M. Abrudean and V. Mureșan

Command Structure Design of a Robot for the Vibro-Acoustic with Scanning Testing
D.C. Comeagă, C. Udrea, O. Donțu and C. Necula

Mechanical Structure Design of a Robot for Vibro-Acoustic with Scanning Testing
D.C. Comeagă, C. Udrea, O. Donțu and C. Necula

Experimental Researches Regarding Strain Measurement of Incrementally Formed Sheet Metal Parts Done Using an Industrial Robot
I. Chera, O. Bologa, G. Racz and R. Breaz

Some Characteristics of the 3(SPS) Parallel Manipulator Inverse Model
L.M. Ungureanu, A. Comanescu and D. Comanescu

Cooperation of Two Industrial Robots for Manipulation Rigid Objects Using SCADA System
M. Sbanca and G.L. Mogan

Kinematic Solutions of a 7 DOF Robotic Arm Using Redundancy Circle and Fuzzy Models
M. Crenganis, R. Breaz, G. Racz and O. Bologa

Comparative Study on Autonomous Robot Trajectory Determination in an Unknown Indoor Environment
T. Gîrbacia
Robot as a Soccer Player in Multi-Robotic Application
M. Hajduk and M. Sukop
334

Tuning a Neural Controller with Distributed Parameters
V. Mureșan, M. Abrudean, H. Vălean, M.L. Ungureșan and T. Coloși
341

Modular Robot with Self-Reconfigurable Capabilities
B. Grămescu and C. Nițu
352

Chapter 3: Applied Dynamics, Mechanics and Engineering

On the Dynamical Systems Stability Control and Applications
M. Migdalovici, D. Baran and G. Vlădeanu
361

Dynamic Simulation of a Motor Vehicle in Virtual Prototyping Environment
V. Țoțu and C. Alexandru
369

Emissions Level Approximation at Cold Start for Spark Ignition Engine Vehicles
S. Tarulescu and A. Soica
375

Influence of the Flow Section Geometry on the Static Characteristic Curves of Proportional Hydraulic Throttle Valves
M. Avram, D. Duminică and C. Buțcășan
385

Artificial Neural Networks for Modeling of Chemical Source Terms in CFD Simulations of Turbulent Reactive Flows
I. Porumbel, A.C. Petcu, F.G. Florean and C.E. Hritcu
395

Technological Inherited Connections in Continuous Method of Deformational Nanostructuring
A. Korchunov, M. Polyakova, A. Gulin and D. Konstantinov
401

An Investigation on Plastic Matrix Composite Materials
C. Misirli, N. Becenen and M. Şahin
406

Theoretical and Experimental Researches Regarding Multilayer Materials Used for Incremental Forming
M. Tera, O. Bologa, R.E. Breaz and S.G. Racz
413

Finite Element Method for Simulating the Vickers Hardness Test
V. Popovici, A.C. Pavalache, I.M. Vasile, I. Voiculescu, E.M. Stanciu and D. Pausan
419

Dynamic Simulation in Mechatronic Concept of a Photovoltaic String Equipped with Solar Tracker
C. Alexandru
425

The Experimental Method for Obtaining Input Data for the Design of an Automatic Magnetic Connection Mechanism
Z. Bobovský, P. Novák and V. Krys
434

Effective Parameters of Solar Water Heating System on Ceramic Drying
M.K. Büyükakın and S. Öztuna
440

The Analysis of the Influence of EMR Effects Provided From the Mobile Phones with Different SAR Index
L. Ungureanu, L. Cristea, M. Bulmaga and D. Cazangiu
446

Mesh Technique for the Finite Element Simulation of Acoustic Fluid-Solid Coupled Analysis
M.B. Neagoe, S. Căănău and L. Mândrea
452

Use of Equimomential Systems in Calculating Inertial and Dynamic Quantities of Plane Plates
N. Orășanu and A. Craifaleanu
458

Neural Temperature Control in a Water Cylinder
I.V. Sîtu and V. Mureșan
466

Chapter 4: Maschine-Tools and Manufacturing Modern Methods

Virtual Analysis of Manufacturability of Vane Pumps
G. Dinev, P. Angelov and E. Chalakova
479

Conceptual Approach of the Environmental Impact Issued by the Manufacturing Process
G.R. Frumușanu and A. Epureanu
485
Rapid Prototyping a Way to Better Optical and Ergonomic Adaptation of Spectacles
A.O. Trufasu, C.I. Rizescu, G. Sorohan and A. Trufasu 491

Theoretical and Experimental Researches on the Balancing Systems of Machine-Tools Feed Kinematic Chains
D. Prodan, A. Bucuresteanu, E. Balan and A. Motomancea 497

Analytical Determination of the CNC Machines High-Speed Feed Drives Position Loop Gain
Z. Pandilov and V. Dukovski 505

Evaluation of True Position Using Coordinate Measuring Machine
R. Budísky, M. Králik and J. Kost 511

Prediction of Temperature in Turning Ti6Al4V
D.A. Coron and S.M. Croitoru 518

Ultrasonic Activated Injection Used on Manufacturing Thin Wall Plastic Parts
A. Andrei, C. Cosma and A. Pop 524

Modeling of Distributed Parameter Processes with Neural Networks
H. Vălean, M. Abrudean, M.L. Ungureșan, I. Clitian and V. Mureșan 530

Shaped Glued Connection of Two Parts Made by Rapid Prototyping Technology
J. Lipina, V. Krys and J. Sedlák 541

Validation of Accelerated Reliability Test Techniques of Industrial Components Using Finite Element Analysis
S.M. Zaharia 549

Finite Element Analysis for Static Behaviour of the CNC Turning Machine Spindle
D. Bardac and C. Dogariu 555

Improving the Capability of a Process Using Statistical Techniques
C. Ile 561

Prediction of the Structural Dynamic Behavior of High Speed Turning Machine Spindles
C. Dogariu and D. Bardac 567

Method for Manufacturing Custom-Shaped Prosthetic Parts from Titanium Alloys by Incremental Forming Using Industrial Robots
C. Cotigă, O. Bologa, G. Racz and R. Breaz 575

Researches Regarding Optimising the Contouring Precision of CNC Laser Cutting Machines
C. Biris, R.E. Breaz, C. Girjob and A. Chicea 580

Parallel Evolutionary Algorithm for Computationally Expensive Single Criteria Design Optimization
S. Krenich 586

Optimum Design of Balancing Systems with Real Springs
L. Ciupită 593

Chapter 5: Human Motricities

On Determining the Optimal Relation between the Mental Tension and Human Motricity
C.L. Ionescu 601

Research Regarding the Influences of the Human Motricity on the Emotional Intelligence
N. Leonte, I. Drăgulin, A. Pricop, L. Becea, O. Popescu and M. Netolitzchi 609

The Assisted Study of the Game Rules Deviations Using the Dartfish Video Platform
C. Pâunescu, G. Piigoi, S. Petrescu and M. Pâunescu 616

The Role of Neuromuscular Control in the Human Psycho Motricities
A.A. Moșoi, R. Rășcanu and C. Gugu-Gramatopol 622

Assisted Research of the Biomechanics Characteristics of the Complex Acrobatic Movement
V. Potop, O.C. Timnea and M.V. Ulareanu 628

Determining Dynamics of the Effort in Physical Education Lesson
A. Ungureanu, G. Muntean and M.O. Dochia 634

Assisted Determination of the Relation between the Ruffier and Margaria Kalamen Tests and the Human Running Test
B.C. Rață, G. Rață, M. Rață and C. Sava 640

Evaluation of Postural Stability Associated to Lifting/Lowering Motions
M.I. Baritz and D. Cotoros 646
Locomotory Diseases Influence on Body Equilibrium and Balance
B.C. Braun and I.C. Rosca 652

Study Regarding Preferential and Performance-Related Lateralization in Human Motricities
A.M. Cojocaru, F. Grapă and M. Cojocaru 659

Assisted Study of the Human Force-Power Parameters Influences to the Kinematics Motricities Characteristics
A. Șerban Tărgoveț and D. Ionescu-Bondoc 665

Simple System for Supporting Learning of Human Motion Capabilities
A.M. Cojocaru, F. Grapă and M. Cojocaru 673

Assisted Study of the Human Force-Power Parameters Influences to the Kinematics Motricities Characteristics
A. Șerban Tărgoveț and D. Ionescu-Bondoc 665

Experimental Research Regarding Rehabilitation Equipment Behavior on a Recovery Program
I.M. Petre 689

Three Dimensional Simulations in Real Time for Personalized Drug Release Prosthesis Used in Lumbosacral Rehabilitation
M.S. Cretan and C. Stamate 695

Estimation of Shoulder Joint Reaction Forces and Moments Using MBS Dynamic Modeling
E. Mereuta, D. Ganea and C. Mereuta 701

Human Body Kinematics and the Kinect Sensor
D. Ganea, E. Mereuta and C. Mereuta 707

The Influence of Vitamin C on the Oxidative Stress in Untrained Smoking Subjects
P.F. Trofin, C. Honceriu, A. Ciobica and D. Cojocaru 713

Measurements of the Human Body Parameters Made with the GDV Camera and the SCIO Device to the Influence of Colloidal Silver Solution
I. Curta, I.C. Rosca, Z. Marosy, A.C. Micu and I. Mohirța 723

Chapter 6: Image Processing

Analysis of Visual Acuity According to the Intensity of Artificial Light
M. Bulmaga, L. Cristea, L. Ungureanu and D. Cazangiu 731

A Fast Estimation of the EO/IR System Performances Using the Image Simulation in a Turbulent Atmosphere
C. Spulber 737

Subjective Assessment of Multispectral Fusion Images
P. Turtoi, D.E. Turcanu and C. Predoi 745

Image Distortion, between Unwanted Geometric Aberration and the Tool Used to Improve Observation Equipment Performance
N. Guzulescu, C. Todirică and D. Lăpădat 751

Access Control Based on a Distributed Fingerprint Recognition System
R.F. Miron and M. Hulea 759

A Contribution to the Performance Estimation of Observability with a Thermal Camera, under Real Conditions of Vibrations and Visibility
O.V. Borcan 765

Specularity Removal for Single Image Based on Inpainting and Blending with Parameter Estimation by Neural Networks over Multiple Feature Spaces
S. Yousaf and S.Y. Qin 773

An Affordable Temporal Calibration Method for Common Video Camera
G. Roca and C.R. Mirescu 781

Automated Random Testing of Image Processing Applications with Effectiveness Measure
T. Jameel, M.X. Lin and S. Yousaf 787

Chapter 7: Management Application

Group Decision Support Systems and Product Lifecycle Management in Robotics
M. Neacșa, G. Adir and V. Adir 799
<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research Regarding the Optimization of Work Relationships within Supply Chain by Defining and Evaluating Job Competencies</td>
<td>805</td>
</tr>
<tr>
<td>Improvements in Quality Assurance for Blowout Preventers Assembling/Disassembling and Maintenance Operations</td>
<td>811</td>
</tr>
<tr>
<td>Towards the Development of a Cyber-Physical Systems Oriented Enterprise Architecture</td>
<td>816</td>
</tr>
<tr>
<td>Cost Optimization in Manufacturing System with Unidirectional AGVs</td>
<td>822</td>
</tr>
<tr>
<td>Occupational Risk Assessment Using Knowledge Applications in Mining Industry - A Didactical Method</td>
<td>829</td>
</tr>
</tbody>
</table>