

Table of Contents

Preface and Committees

Chapter 1: Design and Research of Mechanisms and Machines

Assessment of Systems for Carrying out of Planar Biaxial Tensile Test	3
L. Andrusca, I. Doroftei, P.D. Barsanescu and V. Goanta	
Compounding of Concurrential Rotation Movements	9
O. Antonescu, I. Popescu and P. Antonescu	
The Influence of the Pinion-Shaft Deflection on the Dynamic Characteristics of Helical Gear Pairs	17
V. Atanasiu, C. Oprisan and D. Leohchi	
Optimization Design for Car Suspension Elastic Elements	23
C. Bujoreanu and C. Stirbu	
Consideration Regarding the Inverse Kinematics of a Rowing Skiff under the Action of the Oars Movement	29
M. Chirazi, E. Budescu and E. Merticaru	
Chain Tracking System for Solar Thermal Collector	35
D. Ciobanu, C. Jaliu and R.G. Saulescu	
Algorithms for Noncircular Gear Pitch Curves Generation	41
B. Cristescu, A. Cristescu and L. Andrei	
Singularities Classification for Structural Groups of Dyad Type	47
C. Duca and F. Buium	
Transmission Indices Adoption for 6R Structural Group	55
C. Duca and F. Buium	
Naval Centrifugal Compressor Design Using CAD Solutions	59
C. Dumitache, I. Calimanescu and C. Comandar	
Naval Standard Safety Valve Design Using CAD Solutions	65
C. Dumitache, I. Calimanescu and C. Comandar	
Mechanical Characteristics of Electronic Printed Circuit Obtained by the Vapour Phase Soldering Process	71
G.I. Dumitru, A. Tudor, G. Chisiu and I. Plotog	
Evaluation of Loss of Mass due to Corrosion Using Vibration-Based Methods	77
G.R. Gillich, Z.I. Praisach, H. Furdui, J.L. Ntakpe and A.A. Minda	
Simulation of the Tooth Helix Angle Influence on the Vibration of a Single Stage Helical Gearbox	83
Z.I. Korka, V. Cojocaru and C.O. Miclosina	
Some Aspects Regarding the Mathematical Modeling and Dynamic Simulation of a Single Stage Helical Gearbox	89
Z.I. Korka, C.O. Miclosina and V. Cojocaru	
On the Synthesis of a Five Bar Linkage for Linear Trajectory Using a CAD Analysis	95
C.E. Moldovan and C. Sticlaru	
Low Speed Linear Actuator for Accurate Orientation of Concentrated Solar Convertors	99
M. Neagoe, R.G. Saulescu, O. Munteanu and B. Burduhos	
On a New Parallel Tracking System for Accurate Orientation of Concentrated Solar Convertors	105
M. Neagoe, I. Visa, N. Cretescu and M. Moldovan	
Geometrico-Static Modeling and Simulation of the Contact between Chain and Guide of a Reference Transmission	111
R. Papuc, R. Velicu, M.T. Lates and C. Jaliu	
Contribution on the Optimization of the Spur Gears Design Process Using Software Application	117
G. Plesu and S. Cazan	
Graphic Method Profiling of the End Mill Cutter Generating the Screw Compressor Rotor	123
C.L. Popa and V. Popa	

ZPA Worms – Definition and Technology	
A. Pozdirca	129
Planetary Gear for Counter-Rotating Wind Turbines	
R.G. Saulescu, C. Jaliu, O. Munteanu and O. Climescu	135
Virtual Model to Generate Motions on Cyclic Trajectories	
M.B. Tataru, A. Rus and C. Bungau	141
Dynamic Optimization of a Single-Seater Car Suspension System	
V. Totu and C. Alexandru	147
Structural Synthesis of Parallel Linkages by Multibody Systems Method	
I. Visa, M. Neagoe, M. Moldovan and M. Comsit	153

Chapter 2: Mechanics of Deformable Bodies

Some Consideration Regarding the Models for Collisions with Plastic Indentation	
S. Alaci, F.C. Ciornel and C. Filote	161
Optimizing the Shape and Size of Cruciform Specimens Used for Biaxial Tensile Test	
L. Andrusca, V. Goanta and P.D. Barsanescu	167
V-Beam Thermal Actuator's Performance Analysis Using Digital Image Correlation	
R. Chiorean, M.C. Dudescu, M. Pustan and M. Hărdău	173
Fatigue Analysis of Large Diameter Threaded Connections Subjected to Dynamic Axial Loads	
V. Cojocaru, C.O. Miclosina and Z.I. Korka	177
Stress Analysis and Optimal Design of the Housing of a Two-Stage Gear Reducer	
V. Cojocaru, Z.I. Korka and C.O. Miclosina	183
Experimental Analysis Regarding the Degree of Plastic Deformation of Fractured Surfaces under da/dN, K_{lc} and J_{lc} Determination	
V. Goanta	189
The Influence of the Fatigue Cycles Number on Material Hardness	
V. Goanta	195
Influence of Several Parameters on Simulating the Ballistic Impact on a Homogenous Plate	
C. Pirvu, S. Badea and L. Deleanu	201
An Analytical Solution for Three-Dimensional Elliptical Elastic-Plastic Rolling Contact	
G. Popescu	207
Residual Stresses in Cylindrical Roller Bearings – A Three-Dimensional Analysis Model	
G. Popescu	213
Design of Experimental Test Bench for Determining the Stresses and Strains State of Guitar Neck	
M.D. Stanciu, I. Curtu and D. Mihalache	219
Mechanical Behavior of Guitar Neck under Simple Bending Stress Analyzed with Finite Elements Method	
M.D. Stanciu, I. Curtu and T. Mocanu	225

Chapter 3: Structural Engineering

Deployable Structures for Architectural Applications - A Short Review	
I. Doroftei and I.A. Doroftei	233
Optimal Configuration of Fluid Viscoelastic Seismic Dampers on a Ten Stories Building Using Finite Elements Method	
A. Ionescu, M. Negru and C.O. Burada	241
Influence of Non-Linear Properties of Fluid Viscoelastic Properties on Seismic Damping Properties of a Ten Stories Building Using ANSYS Program	
A. Ionescu, M. Negru and C.O. Burada	245
Experimental Determinations and Comparative Studies of the Stiffness for Some Sandwich Bars Reinforced with Metal Fabric	
C.M. Mirițoiu, M.M. Stănescu, D. Bolcu, A. Stanimir and I. Manea	249

Experimental Determinations of the Eigenmodes for Sandwich Bars with Different Core Reinforced with Metal Fabric

C.M. Mirițoiu, D. Bolcu, M.M. Stănescu and V. Rosca

255

Vibration-Based Crack Detection in L-Frames

J.L. Ntakpe, G.R. Gillich, F. Muntean, Z.I. Praisach and P. Lorenz

261

Chapter 4: Applied Tribology**Influence of the Geometry on the Rolling Friction Torque in Lubricated Ball-Race Contacts**

M.R. Balan, V.C. Stamate, L. Houpert, A. Tufescu and D. Olaru

271

Misalignment Effects in Cylindrical Roller Bearings

M. Benchea, A. Iovan Dragomir and S. Cretu

277

A Comparing Tribological Study of PBT and PBT with Aramid Fibers, for Block-on-Ring Dry Regime

M. Botan, C. Georgescu and L. Deleanu

283

Study on the Defects Size of Ball Bearings Elements Using Vibration Analysis

C. Bujoreanu, R. Monoranu and N.D. Olaru

289

Researches Concerning Friction Influence on Material Cold-Hardening in High Precision Stamping

L.A. Butnar and I.R. Sugar

295

The Influence of the Misalignment on Load Distribution in Angular Contact Ball Bearings

I. Damian, V. Paleu and S. Cretu

299

Influence of the Contact Pressure on the Rolling Resistance Moments in Dry Ball-Race Contacts

A.C. Dumitrascu, G. Ianus and D. Olaru

305

Rolling Bearings Greases Deterioration: Structure, Chemical Composition, Rheology, Service Life Correlations

F. Farcaș and M.C. Tiron

311

Wear Prediction in Wheel-Rail Contact under Partial Slip Conditions

G. Gavrila, S. Cretu and M. Benchea

317

Tribological Study of Ecological Lubricants Containing Titanium Dioxide Nanoparticles

F. Ilie, C. Covaliu and G. Chisiu

323

The Influence of Substrate on the Mechanical and Tribological Characteristics of MEMS Materials for Space Applications

V. Merie, M. Pustan, C. Birleanu and G. Negrea

329

About the Friction of the Wiper Windscreen Contact

I. Musca, G. Musca, D.C. Vultur and B.V. Ungurean

335

Friction Torque Measurement in Partial Hybrid S-C Angular Contact Ball Bearings

V. Paleu, I. Damian and C. Stirbu

339

Wear Model of Sliding Motion Flat Surfaces Used in Mechanical Engineering

I. Petre

345

Non Hertzian Contact Model for Tooth Contact Analysis of Spur Gear with Lead Crowning

N. Pop, S. Cretu and A. Tufescu

351

Dependence between the Favourable Initial (Residual) Stresses and Durability of the Ball Screws

V. Puiu

357

About an Experimental Modeling of Steel Surfaces Wear in Injection of Plastic Composites with Short Glass Fibres

D. Rus, L. Capitanu and V. Florescu

365

Friction in Bearings of Parallel Axes Transmissions

A. Todi-Eftimie, R. Velicu, C. Brands, F. Schlerer and M.T. Lates

371

Jacq Effect Influence on Thermomechanical Contact Fatigue

F.T. Sandu-Ville

377

Experimental Rig for Measuring Lubricant Film Thickness in Rolling Bearings

X.N. Zhang, K. Jablonka and R. Glovnea

381

Chapter 5: Biomechanics in Biomedical Engineering

Stress Study of Removable Partial Denture with Attachments Using Finite Element Analysis	389
O.C. Andrei, L.A. Tanasescu, R. Margarit and M.H. Tielean	
Some Aspects Concerning Modeling the Eye Plant without Ocular Deviations	395
D.M. Barbu	
Modeling of the Seated Human Body in a Vibrational Medium	401
D.M. Barbu	
Analysis and Simulation of Gait Types with Blocked Joints	407
M. Baritz, L.D. Cotoros and D. Barbu	
Evaluation of Comfort Degree for Pushing/Pulling Motions under the Influence of Controlled Induced Vibrations in the Fingers-Hand–Arm Assembly	413
M. Baritz, L.D. Cotoros and I. Balcu	
Prehension of the Small Cylindrical Objects by the Human Fingers: Friction and Adherence Processes	417
A. Barnea, C. Oprișan and D. Olaru	
Techniques, Methods and Instruments for Human Bone Virtual Re-Construction - Main Human Movements Simulations	423
V.C. Dumitru, D.L. Popa, A. Duă and S. Ciunel	
Performance Optimization of Blunt-Prosthesis-Rod Complex with Tribological Considerations	429
R. Filep, D. Arotaritei, M. Turnea, M. Illea and M. Rotariu	
Fracture Resistance of Prosthetic Restored Teeth with Fiberglass Posts versus Metallic Posts	435
R. Margarit, M. Sandu, A. Tanasescu, R.M. Oprea and O.C. Andrei	
3D Analysis for Identification of the Proper Type of Post to Restore the Endodontic Treated Teeth	441
R. Margarit, S. Sorohan, A. Tanasescu, C. Dăguci and O.C. Andrei	
Modeling and Simulation of Physical Parameters of Human Respiratory System	447
C. Meireles, J. Machado and C.P. Leão	
New Design Concept for Reducing Torque Wear on Implant	453
S. Mihai and V. Filip	
Interaction of Particles with the Pulmonary Interface: Effects on Surface Elasticity	459
B. Munteanu, Y. Berthier, J.P. Rieu and A.M. Trunfio-Sfarghiu	
Role of Surface Industrial Finishing Process of Joint Implant UHMWPE on their Tribological Behaviour	465
M. Popa, N. Wang, S. Descartes and A.M. Trunfio-Sfarghiu	
Modeling and Design of Prosthetic Abutment System to Evaluate the Complex Interface	471
M. Rotariu, F. Munteanu, M. Turnea and D. Arotaritei	
Role of Synovial Fluid Constituents on Tribological Behavior of Synovial Joints - Application for Developing Novel Therapeutic Substitutes	477
M.M. Sava, D.M. Suflet, Y. Berthier and A.M. Trunfio-Sfarghiu	
Conceptual Design of a Mechatronic System for Supporting Basic Quality of Life of Bedridden Elderly People	483
B. Silva, J. Machado, V. Carvalho, F. Soares, D. Matos, F. Pereira and K. Bezerra	
Modeling and Simulation Keloid Scar Formation from Biphasic Contact Blunt-Prosthesis	489
M. Turnea, M. Rotariu, D. Arotaritei and M. Illea	
The Kinematic Model with Three Degrees of Freedom Associated to the Direct Throwing in Basketball Game	495
R. Iacob, E. Budescu, E. Merticaru and C. Oprișan	
Biomechanical Aspects of the Lower Limb Positions to the Direct Free Kick at Football	501
L. Popescu and E. Budescu	
Structural and Kinematic Aspects of a New Ankle Rehabilitation Device	507
C.M. Racu Cazacu and I. Doroftei	
Experimental Validation of a Finite Element Model of an Osteoporotic Human Femoral Bone Using Strain Gauge Measurement	513
I.A. Takacs, M.C. Dudescu, M. Hărdău and A.I. Botean	

Experimental Measurement of Flexion-Extension in Normal and Osteoarthritic Knee during Sit-to-Stand Movement	520
D. Tarniță, D. Calafeteanu, I. Matei and D. Tarnita	
Stresses and Displacements for Virtual Models of Healthy and Osteoarthritic Knee Joint	526
D. Tarniță, M. Catana and D. Tarnita	

Chapter 6: Mechatronics, Robotics and Automated Production Systems

Innovative Bidimensional Absolute Transducer Based on Video Detection for Positioning into Micro Assembly Processes	535
M. Ardeleanu, M. Ionita, A. Ivan and V. Gurgu	
Hardware Structures for High Precision Pneutronic Systems	541
M. Avram, V. Constantin, C. Bucșan, D. Besnea and A. Spanu	
Proportional Hydraulic Flow Control Valves with Simple and Differential Command	547
M. Avram, C. Bucșan, D. Dumitriță and A. Popescu-Cuta	
3D CAD, CAM and Rapid Prototyping Applied for Cam Fabrication	553
D. Besnea, G. Ionascu, M. Avram, L. Bogatu and A. Spanu	
New Solution for Telescopic Robotic Arm	557
L. Bogdan and E. Toma	
A Workspace Characterization of the 3-RRR Planar Parallel Mechanism	563
F. Buium, D. Leohchi and I. Doroftei	
Problems Regarding Singularities Analysis of a 3-RRR Parallel Mechanism	569
F. Buium, C. Duca and D. Leohchi	
Low Cost Device for Experimental Tests of Electrorheological Fluids	575
B.V. Chetran and D. Mândru	
Hexapod Locomotion of a Leg-Wheel Hybrid Mobile Robot	581
A. Conduraru Slatineanu, I. Doroftei, I. Conduraru and D. Luca	
Odometry Aspects of an Omni-Directional Mobile Robot with Modified Mecanum Wheels	587
I. Conduraru, I. Doroftei, D. Luca and A. Conduraru Slatineanu	
Planar Robot Grasping Planning Based on Symmetry	593
A. Davidescu and G.G. Savii	
Teodor: A Semi-Autonomous Search and Rescue and Demining Robot	599
G. de Cubber, H. Balta and C. Lietart	
An Overview on Accuracy and Calibration Methods for Manipulators	606
D.R. Dogaru and I. Doroftei	
Designing Search and Rescue Robots towards Realistic User Requirements	612
D. Doroftei, A. Matos and G. de Cubber	
Remote Controlled Wheeled Mobile Robot for Humanitarian Demining Purposes	618
I. Doroftei, R. Malherbe, G. Bred, Y. Baudoin and I. Conduraru	
Optimal Design of the Control System for an Industrial Robot Using DOE Technique and Regression Model	626
M. Enescu and C. Alexandru	
Virtual Planning of Robot Trajectories for Spray Painting Applications	632
T. Gîrbacia, F. Gîrbacia and G. Mogan	
Method and Software for Analyzing the Assembly/Disassembly Operations of Mechanical Products	638
R. Iacob and D. Popescu	
Positioning Systems Actuated by Corrugated Tube Elements	644
V.S. Jișă, B.V. Chetran and D. Mândru	
Development of a Quality Indicator System for Haptic Exoskeleton Modules	648
E.C. Lovasz, M. Mateas, C.M. Gruescu, E.Z. Mărgineanu, I. Carabas and S.D. Stan	
Control Characteristics of Haptic Exoskeleton Elbow Module Used in Space Robotised Applications	654
M. Mateas, E.C. Lovasz, D. Mărgineanu, V. Ciupe, E.S. Zabava, I. Maniu and A. Diaconu	
Comparative Analysis of the Structures 4R and 3T Robots	660
C. Ocnărescu and I. Simionescu	

Finishing System Based on Ultrasonic Computerized Processes for Textiles F. Pantilimonescu, L.C. Hanganu, M. Peptanariu, S. Grigoras, I. Ionescu, G.L. Potop, A. Iovan-Dragomir and S.C. Hanganu	666
Augmented Reality Used for Robot Remote Control in Educational Laboratories I. Pasc, L. Csokmai, F. Popentiu-Vladicescu and R. Tarca	672
Image Processing and Artificial Neural Network for Robot Application C. Pop, S.M. Grigorescu and E.C. Lovasz	678
Analysis of the Trajectory Shape Described by a Robotic Leg during a Walking Sequence F. Pop, V. Dolga and C. Pop	684
Modal Analysis of a MEMS Cantilever A. Popescu-Cuta, G. Ionascu, O. Donțu, M. Avram, C.D. Comeaga and E. Manea	690
Dynamic Behavior of MEMS Resonators M. Pustan, C. Birleanu, F. Rusu and S. Haragăș	694
Parameter Identification and Modeling of a Pneumatic Proportional Valve with Applicability in Control Design of Servo-Pneumatic Systems C.R. Rad, O. Hancu, V. Maties and C. Lapusan	700
Improving the Image Accuracy for Grasping A. Spanu, M. Avram and D. Besnea	706
Gripper System for Handling the Book on the Library Shelf Out A. Spanu, M. Avram and C. Bucsan	712
The Structure, Work Space and Direct Kinematic of the Robots with 8 Axes of Type T Normal R Parallel (PM)(OM) I. Staretu	718
Development of the Microrobot for Indoor Pipeline M.O. Tătar, D. Mândru and V.S. Jisa	724
Validation of the Expert System Used for Optimum Gripping Surfaces Identification for an Injection-Molded Part P.D. Tocut, C. Tripe Vidican, I.C. Tarca and C. Bungau	730
Method Used to Identify the Optimum Gripping Surfaces for an Injection-Molded Part P.D. Tocut, C. Tripe Vidican, I.C. Tarca and C. Bungau	736