

# Contents

## Part I MTM—Mechanisms—Analysis and Synthesis

<b>Optimal Design of a Grasping Device Through Simplified Pose Synthesis of a Four-Bar Linkage</b> . . . . .	3
V. Mesaros-Anghel, E.-C. Lovasz, C.M. Gruescu and C.E. Moldovan	
<b>Modified Method of the Kinematic Analysis of Planar Linkage Mechanism for Non-stationary Motion Modes</b> . . . . .	15
J. Drewniak, P. Garlicka, J. Kopeć and S. Zawislak	
<b>A Type Synthesis Method for Parallel Mechanisms Based on SAKCs</b> . . . . .	25
Huiping Shen, Chi-Yu Sun, Dan Zhang and Ting-li Yang	
<b>Matlab GUI for SVAJ Cam Analysis Diagrams</b> . . . . .	37
C. Pop, E.-C. Lovasz, F. Pop, A. Davidescu and S.M. Grigorescu	
<b>On the Kinematic Analysis of a Sixth Class Mechanism</b> . . . . .	47
C.E. Moldovan, D. Perju, E.-C. Lovasz, K.-H. Modler and I. Maniu	
<b>Zero-Free-Length Elastic Systems for Static Balancing</b> . . . . .	59
L. Ciupitu and I. Simionescu	
<b>Analytic and FEM Study of Load Distribution on the Length of Spline Joints Under Pure Torque</b> . . . . .	69
D. Mărgineanu, C. Sticlaru, A. Davidescu and E. Mărgineanu	
<b>Dimensional Synthesis of Planar Parallel Manipulator Using Geared Linkages with Linear Actuation as Kinematic Chains</b> . . . . .	77
S.M. Grigorescu, E.-C. Lovasz, D.T. Mărgineanu, C. Pop and F. Pop	

## **Part II MTM—Dynamics of Mechanisms and Machines**

<b>The Concept of Natural Motion for Pick and Place Operations . . . . .</b>	<b>89</b>
J.P. Barreto, F. J.-F. Schöler and B. Corves	

<b>Structural Synthesis of Planar Geared Linkage Mechanisms as Multibody Systems . . . . .</b>	<b>99</b>
I. Visa, M. Neagoe and M.D. Moldovan	

<b>Dynamics of a Vertical Unbalanced Gyroscopic Rotor with Nonlinear Characteristics . . . . .</b>	<b>107</b>
Zh. Iskakov	

## **Part III MTM—Mechanical Transmissions**

<b>Edge Tooth Addendum Thickness of Hindley Worm . . . . .</b>	<b>117</b>
Yaping Zhao	

<b>A Single Speed (CVT) Transmission . . . . .</b>	<b>125</b>
K. Ivanov, B. Tultayev and G. Balbayev	

<b>An Approach for Modelling Harvester Head Mechanism in the Harvesting Process of Hardwood Stands . . . . .</b>	<b>133</b>
B. Hatton, B.C. Bouzgarrou, J.-C. Fauroux, V. Gagnol and G. Gogu	

<b>Novel Speed Increaser Used in Counter-Rotating Wind Turbines . . . . .</b>	<b>143</b>
M. Neagoe, R. Saulescu, C. Jaliu and N. Cretescu	

## **Part IV MTM—Micromechanisms and Microactuators**

<b>On Application Melnikov Method to Detecting the Edge of Chaos for a Micro-Cantilever . . . . .</b>	<b>155</b>
J. Xie, S.-H. He, Z.-H. Liu and Y. Chen	

## **Part V MTM—Computational and Experimental Methods**

<b>Use of the <i>Structomatic</i> Method to Perform the Forward Kinematic and Kinetostatic Analyses of a Hydraulic Excavator . . . . .</b>	<b>167</b>
M. Mailloux, M. Éné, I. Simionescu and I. Tabara	

<b>Application of a Cam Workbench for Education in Mechanical Engineering . . . . .</b>	<b>177</b>
H. Chen, T.T.N. Nguyen, M. Müller, S. Kurtenbach, C. Pan, M. Hüsing and B. Corves	

<b>Kinematic Characterization of the Origami Spring Based on a Spherical 6R Linkage . . . . .</b>	<b>187</b>
Hiroshi Matsuo, Daisuke Matsuura, Yusuke Sugahara and Yukio Takeda	

<b>Scaled Test Stand Simulation for Studying the Behavior of Anti-lock Brake Systems on Bumpy Roads</b> . . . . .	197
V. Ciupe, D. Mărgineanu and E.-C. Lovasz	

## **Part VI MTM—Terminology**

<b>Activities of Russian—Speaking Scientists in Development of MMS Terminology</b> . . . . .	209
V.E. Starzhinsky, E.V. Shalobaev, M.M. Kane and V.I. Goldfarb	

<b>State of Art in Separate Sections of MMS Terminology and Some Proposals</b> . . . . .	217
E.V. Shalobaev, S.V. Shil'ko, R.T. Tolocka, V.E. Starzhinsky, G.N. Iurkova and D.G. Surikov	

## **Part VII Robotics—Mechanical Design of Robot Architecture**

<b>Design Solutions to Simplify the Calibration of a Robotic Flexible Manufacturing System</b> . . . . .	229
A.-M. Stoian, I. Maniu, E.-C. Lovasz and C.M. Gruescu	

## **Part VIII Robotics—Mobile Robots**

<b>Reconbot: A Reconfigurable Rescue Robot Composed of Serial-Parallel Hybrid Upper Humanoid Body and Track Mobile Platform</b> . . . . .	241
W. Ding, T. Detert, B. Corves and Y.A. Yao	

<b>Kinematics Modelling of Mobile Robot with Articulated Limbs Without Wheel Slip</b> . . . . .	251
P. Sperzyński and A. Gronowicz	

<b>Experimental Platform for Hexapod Locomotion</b> . . . . .	259
M. Nițulescu, M. Ivănescu, S. Mănoiu-Olaru and V.D.H. Nguyen	

<b>Quadcopter Propeller Design and Performance Analysis</b> . . . . .	269
Endrowednes Kuantama, Dan Craciun, Ioan Tarca and Radu Tarca	

<b>A Method for Structural Synthesis of Cooperative Mobile Manipulators</b> . . . . .	279
Z.-E. Chebab, J.-C. Fauroux, G. Gogu, N. Bouton, L. Sabourin and Y. Mezouar	

<b>Mobile Robot Used to Collect Data from a Difficult Access Area</b> . . . . .	287
R. Zemouri and P.C. Patie	

**Part IX Robotics—Parallel Robots**

<b>Extended Procedure for Stiffness Modeling Based on the Matrix Structure Analysis. . . . .</b>	<b>299</b>
T. Detert and B. Corves	
<b>Translational Parallel Manipulator with Pa<sup>2</sup> Kinematic Joints . . . . .</b>	<b>311</b>
A. Hernandez, Z. Zhang, V. Petuya, E. Macho and E. Amezua	
<b>Synthesis and Modeling of Redundantly Actuated Parallel Kinematic Manipulators—An Approach to Efficient Motion Design. . . .</b>	<b>321</b>
T. Haschke, M. Lorenz, J. Brinker, M. Hüsing and B. Corves	
<b>6-PSS Based Parallel Manipulators . . . . .</b>	<b>331</b>
T.A. Dwarakanath, K.D. Lagoo and D.N. Badodkar	

**Part X Robotics—Sensors and Actuators in Robotics**

<b>Compliant Rotary Actuator Driven by Shape Memory Alloy . . . . .</b>	<b>343</b>
H. Yuan, X. Balandraud, J.C. Fauroux and F. Chapelle	
<b>Modelling and Simulation of Linear Actuators in Mechatronic Systems . . . . .</b>	<b>351</b>
V. Dolga, L. Dolga and C. Moldovan	

**Part XI Robotics—Robotic Control Systems**

<b>Dynamic Control for a Class of Continuum Robotic Arms . . . . .</b>	<b>361</b>
M. Ivanescu, M. Nitulescu, V.D.H. Nguyen and M. Florescu	
<b>Actuator Design for Stabilizing Single Tendon Platforms . . . . .</b>	<b>371</b>
D. Haarhoff, M. Kolditz, D. Abel and S. Brell-Cokcan	
<b>Model-Based Stability Prediction of a Machining Robot . . . . .</b>	<b>379</b>
S. Mousavi, V. Gagnol, B.C. Bouzgarrou and P. Ray	

**Part XII Robotics—Biomedical Engineering**

<b>Augmented PID Control of a 2PPR-2PRP Planar Parallel Manipulator for Lower Limb Rehabilitation Applications. . . . .</b>	<b>391</b>
J.K. Mohanta, M. Santhakumar, S. Kurtenbach, B. Corves and M. Hüsing	
<b>Human Motion Characterization Using Wireless Inertial Sensors . . . . .</b>	<b>401</b>
M. Olinski, A. Gronowicz, M. Ceccarelli and D. Cafolla	
<b>Trajectory Analysis for Modified Jansen Leg Mechanism Configuration . . . . .</b>	<b>409</b>
F. Pop, E.-C. Lovasz, C. Pop, V. Dolga and S.M. Grigorescu	

<b>Development of an Assisting Instrument of Standing-Up Motion Using Driving Springs for Elderly Persons . . . . .</b>	<b>417</b>
H. Terada, K. Makino, K. Ishida and M. Ichikawa	
<b>An Evolutionary Computational Algorithm for Trajectory Planning of an Innovative Parallel Robot for Brachytherapy . . . . .</b>	<b>427</b>
F. Gîrbacia, D. Pîslă, S. Butnariu, B. Gherman, T. Gîrbacia and N. Plitea	
<b>Inverse Kinematics and Dynamics of an Overconstrained Manipulator for Upper Extremity Rehabilitation . . . . .</b>	<b>437</b>
Ö. Selvi and K. Yilmaz	
<b>Part XIII Robotics—Teleoperation, Haptics, Virtual Reality</b>	
<b>Image Processing Based Stiffness Mapping of a Haptic Device . . . . .</b>	<b>447</b>
B. Taner and M.İ.C. Dede	
<b>Part XIV Robotics—Compliant Structures</b>	
<b>Kinematic Analysis of a Flexible Tensegrity Robot . . . . .</b>	<b>457</b>
O. Altuzarra, M. Diez, J. Corral and F.J. Campa	
<b>Adaptive Compliant Gripper Finger with Embedded Contracting and Extending Actuators . . . . .</b>	<b>465</b>
A. Milojević, N.D. Pavlović and H. Handroos	
<b>Kinematic and Dynamic Analysis of a 4DOF Parallel Robot with Flexible Links . . . . .</b>	<b>473</b>
N. Cretescu, M. Neagoe and R. Saulescu	
<b>Part XV Robotics—Robotic Applications</b>	
<b>Automated Handling and Draping of Reinforcing Textiles—Challenges and Developments . . . . .</b>	<b>485</b>
J. Brinker, I. Prause, P. Kosse, H.-C. Früh, S. Printz, C. Henke, M. Hüsing, B. Corves, R. Schmitt, T. Gries and S. Jeschke	
<b>Author Index . . . . .</b>	<b>495</b>

New Advances in Mechanisms, Mechanical  
Transmissions and Robotics

Proceedings of The Joint International Conference of  
the XII International Conference on Mechanisms and  
Mechanical Transmissions (MTM) and the XXIII  
International Conference on Robotics (Robotics '16)

Corves, B.; Lovasz, E.-C.; Hüsing, M.; Maniu, I.; Gruescu,  
C. (Eds.)

2017, XVII, 497 p. 275 illus., Hardcover

ISBN: 978-3-319-45449-8