

LODZ UNIVERSITY OF TECHNOLOGY

Volume 20

Number 3, 2016

**Mechanics  
and  
Mechanical  
Engineering**

Editor in Chief: Tomasz Kapitaniak

Łódź, Poland

**MECHANICS AND  
MECHANICAL ENGINEERING  
International Journal**

**Editor in chief – Tomasz Kapitaniak**

Mechanics and Mechanical Engineering  
Editorial Office

Division of Dynamics, Lodz University of Technology  
90-924 Łódź, Poland, Tel. (48 42) 636 68 22

**Editorial board**

J. Brindley – Leeds	M. S. El Naschie – Cambridge
J. Giergiel – Rzeszów	W. Ostachowicz – Gdańsk
M. Giergiel – Kraków	Z. Peradzyński – Warsaw
W. Kaniewski – Łódź	W.-H. Steeb – Johannesburg
M. Królak – Łódź	C. Szczepaniak – Łódź
K. Li – Michigan	A. Tylikowski – Warsaw
J. Manevich – Dniepropetrovsk	K. E. Thylwe – Stockholm
A. Nayfeh – Blacksburg	M. Wiercigroch – Aberdeen

Editorial Secretary: A. Jach, [anna.jach@p.lodz.pl](mailto:anna.jach@p.lodz.pl)

*Scope of the journal*

Mechanics and Mechanical Engineering publishes original papers, notes, and invited review articles from all fields of theoretical and applied mechanics as well as mechanical engineering. In addition to the classical fields, such as Rigid Body Dynamics, Elasticity, Plasticity, Hydrodynamics and Gas Dynamics, it gives special attention to recently developed and boundary areas of mechanics. As a rule, only contributions written in English will be accepted.

**ISSN 1428–1511**

**e-ISSN 2354–0192**

**on-line: [www.kdm.p.lodz.pl](http://www.kdm.p.lodz.pl)**

**Copyright Tomasz Kapitaniak, 2002-2016**

Submission of manuscript implies: that the work described has not been published before (except in the form of an abstract or as part of a published lecture, review, or thesis); that is not under consideration for publication elsewhere; that its publication has been approved by all coauthors, if any, as well as by the responsible authorities at the institute where the work has been carried out; that, if, and when the manuscript is accepted for publication, by authors agree to automatic transfer of the copyright to the publisher; and that the manuscript will not be published elsewhere in any language without consent of the copyright holders.

## CONTENTS

<b>M. YUVAPERIYASAMY, R. KAILASAM, R. PREMKUMAR and S. VINOTHKUMAR</b>	
Structural Analysis of Dual Brake System	195
<b>R. SELVAMANI</b>	
Dispersion Analysis in a Fluid-Filled and Immersed Transversely Isotropic Thermo-Electro-Elastic Hollow Cylinder	209
<b>Osman M. KAMEL and Adel S. SOLIMAN</b>	
A Semi – Analytic First Order Jupiter – Saturn Planetary Theory. Part II	233
<b>Norbert KĘPCZAK, Witold PAWŁOWSKI, Marek KLICH and Łukasz KACZMAREK</b>	
Mechanical Properties of the Mineral Cast Material at the Macro and Micro Level	249
<b>Ryszard WÓJCIK and Przemysław WEJMAN</b>	
Grinding Process Results with Oil Mist	255
<b>Praveen AILAWALIA</b>	
Internal Heat Source in Temperature Rate Dependent Thermoelastic Medium with Hydrostatic Initial Stress	263
<b>Piotr BASZCZYŃSKI, Sebastian DZIOMDZIORA and Rafał NAZE</b>	
Numerical Model of CAI Test for Fibre-Reinforced Polymer Plate	279
<b>Artur CIEŚLIŃSKI, Wojciech PRYM, Mateusz STAJUDA and Dariusz WITKOWSKI</b>	
Investigation on Aerodynamics of Super-Effective Car for Drag Reduction	297
<b>Olga LYKHACHOVA</b>	
Numerical Simulation of Axially Compressed Cylindrical Shells with Circular Cutouts	311

**Małgorzata SIKORA**

Radial Stiffness of Combined Journal and Thrust Hydrostatic Bearing 323

**Samir TADJEDIT, Lahouari TEMIMI, Ahmed BOUTAOUS,  
Allel MOKADEM, Bendouma DOUMI and Nadir BELDJOUDI**

Comparative Studies by a Genetic Algorithm on the Mechanical Properties  
of PLA and Epoxy Biocomposite Materials Reinforced with Alfa Natural Fiber 333

**B. SURESH KUMAR, V. VIJAYAN and N. BASKAR**

Burr Dimension Analysis on Various Materials for Conventional and CNC Drilled Holes 349