

Editors: Nikos Mastorakis, Valeri Mladenov, Zoran Bojkovic, Fragkiskos Topalis, Kleanthis Psarris, Alina Barbulescu, Hamid Reza Karimi, George J. Tsekouras, Abdel-Badeeh M. Salem, Luige Vladareanu, Aleksandar Nikolic, Dana Simian, Berenika Hausnerova, Stevan Berber, Nikolaos Bardis, Azami Zaharim, Chandrasekaran Subramaniam

# **Recent Researches**

in Mechanics

 Proceedings of the 2<sup>nd</sup> International Conference on
Fluid Mechanics and Heat and Mass Transfer 2011 (FLUIDSHEAT '11)
Proceedings of the 2<sup>nd</sup> International Conference on Theoretical and Applied Mechanics 2011 (TAM '11)
Proceedings of the 4<sup>th</sup> WSEAS International Conference on Urban Planning and Transportation (UPT '11)
Proceedings of the 4<sup>th</sup> WSEAS International Conference on Cultural Heritage and Tourism (CUHT '11)

Corfu Island, Greece, July 14-16, 2011



ISBN: 978-1-61804-020-6



### **RECENT RESEARCHES in MECHANICS**

Proceedings of the 2nd International Conference on Fluid Mechanics and Heat and Mass Transfer 2011 (FLUIDSHEAT '11) Proceedings of the 2nd International Conference on Theoretical and Applied Mechanics 2011 (TAM '11) Proceedings of the 4th WSEAS International Conference on Urban Planning And Transportation (UPT '11) Proceedings of the 4th WSEAS International Conference on Cultural Heritage and Tourism (CUHT '11)

> Corfu Island, Greece July 14-16, 2011

Published by WSEAS Press www.wseas.org ISBN: 978-1-61804-020-6

## **RECENT RESEARCHES in MECHANICS**

Proceedings of the 2nd International Conference on Fluid Mechanics and Heat and Mass Transfer 2011 (FLUIDSHEAT '11) Proceedings of the 2nd International Conference on Theoretical and Applied Mechanics 2011 (TAM '11) Proceedings of the 4th WSEAS International Conference on Urban Planning And Transportation (UPT '11) Proceedings of the 4th WSEAS International Conference on Cultural Heritage and Tourism (CUHT '11)

Corfu Island, Greece July 14-16, 2011

Published by WSEAS Press www.wseas.org

Copyright © 2011, by WSEAS Press

All the copyright of the present book belongs to the World Scientific and Engineering Academy and Society Press. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of the Editor of World Scientific and Engineering Academy and Society Press.

All papers of the present volume were peer reviewed by two independent reviewers. Acceptance was granted when both reviewers' recommendations were positive. See also: http://www.worldses.org/review/index.html

ISBN: 978-1-61804-020-6





World Scientific and Engineering Academy and Society

North Atlantic University Union

### **RECENT RESEARCHES in MECHANICS**

Proceedings of the 2nd International Conference on Fluid Mechanics and Heat and Mass Transfer 2011 (FLUIDSHEAT '11) Proceedings of the 2nd International Conference on Theoretical and Applied Mechanics 2011 (TAM '11) Proceedings of the 4th WSEAS International Conference on Urban Planning And Transportation (UPT '11) Proceedings of the 4th WSEAS International Conference on Cultural Heritage and Tourism (CUHT '11)

> Corfu Island, Greece July 14-16, 2011

#### **Editors:**

Prof. Nikos Mastorakis, Technical University of Sofia, Bulgaria Prof. Valeri Mladenov, Technical University of Sofia, Bulgaria Prof. Zoran Bojkovic, University of Belgrade, Serbia Prof. Fragkiskos Topalis, National Technical University of Athens, Greece Prof. Kleanthis Psarris, The University of Texas at San Antonio, USA Prof. Alina Barbulescu, Ovidius University of Constanta, Romania Prof. Hamid Reza Karimi, University of Adger, Norway Prof. George J. Tsekouras, Hellenic Naval Academy, Greece Prof. Abdel-Badeeh M. Salem, Ain Shams University, Egypt Prof. Luige Vladareanu, Romanian Academy, Romania Prof. Aleksandar Nikolic, University of Belgrade, Serbia Prof. Dana Simian, University Lucian Blaga of Sibiu, Romania Prof. Berenika Hausnerova, Tomas Bata University in Zlin, Czech Republic Prof. Stevan Berber, The University of Auckland, New Zealand Prof. Nikolaos Bardis, Hellenic Army Academy, Greece Prof. Azami Zaharim, Universiti Kebangsaan, Malaysia Prof. Chandrasekaran Subramaniam, Anna University of Technology, India

#### **International Program Committee Members:**

Azami Zaharim, MALAYSIA Blaise Nsom, FRANCE **Dimitrios Pavlou, GREECE** C. Booth, UK R. Brandtweiner, AUSTRIA Enrique Arias, SPAIN Faridatulazna Ahmad Shahabuddin, MALAYSIA Gavriletea Marius, ROMANIA Gherghinescu Sorin, ROMANIA G. Fadda, CHILE S. Macedo, BRAZIL Bruno Grbac, CROATIA Claudio Guarnaccia, ITALY Cruceanu Catalin, ROMANIA Horatiu Teodorescu, ROMANIA Khan Amanat, BANGLADESH Kuei-Yang Wu, TAIWAN M. Reza Emami Azadi, IRAN Madalina Calbureanu, ROMANIA Matthew Karlaftis, GREECE Michelle Duffy, AUSTRALIA Mircea Badescu, ROMANIA Murude Celikag, CYPRUS Roxana Marinescu, ROMANIA Saeed-Reza Sabbagh Yazdi, IRAN Seved Yousef Sadiadi, UNITED KINGDOM Shahriar Quayyum, BANGLADESH Slavka Zekovic, SERBIA Smaranda Adina Cosma, ROMANIA Sonia Degeratu, ROMANIA Vassilis Gekas, GREECE Abir Kassem, EGYPT Agita Livina, LATVIA Ahadollah A'zami, IRAN Androniki Tsouchlaraki, GREECE Ang-cheng kris Ho, TAIWAN Asghar Mohammad Moradi, IRAN

Xin Wang, CHINA David Greiner, SPAIN Manoj Jha, UNITED STATES Kenzu Abdella, CANADA Roman Adinberg, ISRAEL Coman Adrian-Viorel, ROMANIA Jerome Anthoine, BELGIUM Michael Aronov, UNITED STATES Mohammadmasoud Azhdari moghaddam, IRAN Regita Bendikiene, LITHUANIA Helmut Benigni, AUSTRIA A. C. Benim, GERMANY Friedrich-Karl Benra, GERMANY Stasys Bockus, LITHUANIA Hermenegildo Borges de Oliveira, PORTUGAL Mircea Boscoianu, ROMANIA Malek Bouhadef, ALGERIA Andris Buikis, LATVIA Adriana Catanase, ROMANIA Costin Cepisca, ROMANIA Claudia Cherubini, ITALY Ashfaque Ahmed Chowdhury, AUSTRALIA J. P. Curtis, UK Farhang Daneshmand, IRAN George Darie, ROMANIA Konrad Domke POLAND Michel El Hayek, LEBANON Tayfour Elbashir, OMAN Arpad Fay, HUNGARY Petr Filip, CZECH REPUBLIC Nicolas Galanis, CANADA Sergey Gaponov, RUSSIA Aitor J. Garrido, SPAIN majid Ghassemi, IRAN Yury Gogotsi, UNITED STATES Jonas Gyly, USA Vasileios Hamosfakidis, UNITED STATES Assia Helali, FRANCE

Jun Huang, FINLAND Dagmar Janacova, CZECH REPUBLIC Mak Kai Long, HONG KONG S.A.R. X.Kakatsios, GREECE Bouhadef Khedidja, ALGERIA Jaewon Kim, KOREA Karel Kolomaznik, CZECH REPUBLIC Pavel Kuibin, RUSSIA Albert Kurbatskiy, RUSSIA T.-W. Lee, UNITED STATES V. C. Loukopoulos, GREECE Fathi Mahfouz, EGYPT D. S. Mathioulakis, GREECE Mohamed Maidi, UNITED KINGDOM Elena Martvn, SPAIN Sushanta K Mitra, INDIA Dawid Myszka, POLAND Santirat Nansaarng, THAILAND Jiri Neustupa, CZECH REPUBLIC Cong Tam Nguyen, CANADA Guillermo Paniagua, BELGIUM Thales Papazoglou, GREECE Sophia Psychoudaki, GREECE Yulia Peet, FRANCE Guillaume Polidori, FRANCE Jiri Pospisil, CZECH REPUBLIC Thomas Prevenslik, GERMANY Robert Pucher, AUSTRIA Mohammad Rasul, AUSTRALIA Mourad Rebay, FRANCE Constantin Rotaru, ROMANIA Gilles Roy, CANADA Saeed-Reza Sabbagh-Yazdi, IRAN M. Sakellariou-Makrantonaki, GREECE Lamberto Tronchin, ITALY Martin van den Toorn, THE NETHERLANDS Heimo Walter, AUSTRIA Ying Wang, CHINA Dirk Weltersbach, GERMANY Henning Zindler, GERMANY **Evangelos Sapountzakis, GREECE** Manouchehr Amiri, IRAN Viktor Baranov, RUSSIA Tomas Bodnar, CZECH REPUBLIC L. Borges, PORTUGAL Fernando Carapau, PORTUGAL Paulo Correia, PORTUGAL Paul Deuring, FRANCE Alexander Dmitriev, RUSSIA Bernard Ducomet, FRANCE Paschalis Grammenoudis, GERMANY Alexander Gvozdev, RUSSIA Toshiaki Hishida, JAPAN Joao Janela, PORTUGAL Roger Khavat, CANADA Stanislav Krasmar, CZECH REPUBLIC Petr Kucera, CZECH REPUBLIC

Aouni Lakis, CANADA Vladislav Malinin, RUSSIA Alexey Markin, RUSSIA Nikolay Matchenko, RUSSIA Bugaru Mihai, ROMANIA Jiri Neustupa, CZECH REPUBLIC Juan Ospina, COLOMBIA Adelia Sequeira, PORTUGAL Yoshihiro Shibata, JAPAN Nickolay Smirnov, RUSSIA Maria Specovius-Neugebauer, GERMANY Aleksander Treschev, RUSSIA Nikolay Tutyshkin, RUSSIA Werner Varnhorn, GERMANY Kobelev Vladimir, GERMANY

#### **Table of Contents**

Dimensioning Control of Non-Rigid Parts using the Iterative Displacement Inspection with the	13
Maximum Normed Residual Test	
A. Aidibe, A. Tahan, G. N. Abenhaim	
Dynamics of Condensate Migration in Porous Media Under Ambient Treatments	19
Eko Siswanto, Hiroshi Katsurayama, Yasuo Katoh	
Numerical Investigation on the Heat Transfer and Flow Characteristics of a Leading Edge	25
Impingement Cooling System for Low Pressure Turbine Vanes	25
Pedro de la Calzada, Jose Javier Alvarez	
Direct Simulations of Line Source Dispersion in a Turbulent Channel Flow	33
Anjani Kalyan Karna, Dimitrios V. Papavassiliou	
Numerical Analysis of the Fluid Flow in a Channel between Cas Turkings and Heat Decouver	37
<u>Numerical Analysis of the Fluid Flow in a Channel between Gas Turbines and Heat Recovery</u> Steam Generator	57
H. Walter, C. Dobias, F. Holzleithner, R. Hofmann	
Service Robots: Design and Construction	45
S. M. Hosseini Monsef, Y. Maddahi, A. Maddahi	10
Someitinity Amelysis of the Deem Desistance of Het Delled IDF 200 Dusfile	51
Sensitivity Analysis of the Beam Resistance of Hot-Rolled IPE 200 Profile	51
Z. Kala	
Examples of Application of Fuzzy Logic to Building Industry Research	56
L. Puklicky, Z. Kala	
Critical Conditions of Epitaxy, Mixing and Sputtering for Cu Cluster Deposition on Si Substrate	60
Shun-Fa Hwang, Yi-Hung Li, Zheng-Han Hong	
<b>Biomass Steam Gasification – Mathematical Modeling of an Innovative Pressurized Gasification</b>	66
Process	00
Thomas Grobl, Heimo Walter, Markus Haider	
Wear of Cannon 2A46 Barrel Bore	72
Robert Jankovych, Stanislav Beer	
Forest Fires 2D Numerical Simulation	77
<u>Forest Fires 2D Numerical Simulation</u> Andrey Kuleshov, Elena Myshetskaya	11
Andrey Kuleshov, Elena Wysnelskaya	
Influence of Elevator Moving Pattern and Velocity on the Airflow Uniformity for an LCD Panel	81
Delivery Facility Sheam-Chyun Lin, Bor-Jang Tsai, Cheng-Ju Chang	
Sneam Creyan Lin, Dor Jung Isun, Chellg-Ju Chung	

Experimetal Study of Full Cone Spray Nozzle by Interferometry Particle Sizing Technique	88
D. Jasikova, M. Kotek, T. Lenc, V. Kopecky	
Investigations of Boundary Treatments in Incompressible Smoothed Particle Hydrodynamics for	92
Fluid-Structural Interactions	
Fanfan Sun, Mingyi Tan, Jing T. Xing	
Asymptotic Analysis of Stability of Slightly Curved Two-Phase Shallow Mixing Layers	98
I. Eglite	
Stability and Vibration of Axially Moving Plates under Partially Distributed Edge Loads	102
T. H. Young, S. J. Huang, A. C. Liu	
Numerical HVAC Analysis of Shape-Stabilized Phase Change Material Plates Coupling an Active	108
Building Envelope System in a Building	
Bor-Jang Tsai, Sheam-Chyun Lin, Wei-Cheng Yang	
<b>Real-time Thermal Model of Chemical Mechanical Polishing</b>	114
Hsien-Chang Shih, Sheam-Chyun Lin, Chao-Chang Chen, Zong-Ching Lin	
Direct Computation of Evaporation Rate at the Surface of Swimming Pool	120
Nikolay A. Vinnichenko, Alexander V. Uvarov, Dmitry A. Vetukov, Yulia Y. Plaksina	
Effects of the Heating Behavior of Single Rooms on the Energy Consumption and Comfort in	125
Low Energy and Standard House	
H. Huber-Fauland, K. Ponweiser	
Numerical Simulation of Oscillatory Flow Past and Heat Transfer from a Cylinder	130
Betti Bollo, Laszlo Baranyi	
<b>Optimization of Elastic Circular Plates with Additional Supports</b>	136
Jaan Lellep, Julia Polikarpus	
Scaled Experiment for Loss of Vacuum Accidents in Nuclear Fusion Devices: Experimental	142
Methodology for Fluid-Dynamics Analysis in STARDUST Facility	
M. Benedetti, P. Gaudio, I. Lupelli, A. Malizia, M. T. Porfiri, M. Richetta	
Micromechanical Experiments of Interlaminar Deformation and Damage in Angle-Ply	148
Thermoplastic Composite Laminates	
Min Shen, Jingwei Tong, Shibin Wang, Hongqi Li	
Existence of Shocklets in Supersonic Boundary Layer and Its Relation with 3-D Disturbances	152
Yihong Fang, Yifang Liu, Xingfu Ye	
Boundary Layer Flows Induced by Permeable Continuous Surfaces Stretched with Prescribed	158
Skin Friction	
Mohamed Ali, Khaled Al-Salem	

<u>A Channel Flow Affected by a Synthetic Jet Array – An Experimental Study</u> Petra Dancova, Zdenek Travnicek, Tomas Vit, Michal Kotek	164
Recording and Evaluating Methods of Experimental Research of T-Junction Flow Michal Kotek, Vaclav Kopecky, Darina Jasikova	169
Thermal Analysis of a High Power LED Multi-Chip Package Module for Electronic Appliances Bor-Jang Tsai, Sheam-Chyun Lin, Wei-Kuo Han	173
CFD Simulation of the Liquid Metal Flow in High Power Laser Welding of Aluminum with Electromagnetic Weld Pool Support Marcel Bachmann, Vjaceslav Avilov, Andrey Gumenyuk, Michael Rethmeier	179
Experimental Evaluation of Backsplash on Falling Film Tube Bundles with Smooth Cooper Tubes Libor Chroboczek, Jiri Pospisil, Zdenek Fortelny, Pavel Charvat	185
A Comparative Study of Separated Boundary Layer Transition on a Flat Plate with a Blunt/Semi-Circular Leading Edge Zhiyin Yang	191
Jet Noise Predictions Using Large Eddy Simulations Anastasios S. Lyrintzis, Gregory A. Blaisdell	196
Solution of Solidification of a Binary Alloy by a Local Meshless Technique Gregor Kosec, Miha Zaloznik	201
Numerical Investigation on Performance and Environmental Impact of a Compound Wing in Ground Effect S. Jamei, A. Maimun, S. Mansor, N. Azwadi, A. Priyanto	207
Numerical Investigations of Flow on the Kaplan Turbine Runner Blade Anticavitation Lip with Modified Cross Section Vasile Cojocaru, Daniel Balint, Viorel Constantin Campian, Dorian Nedelcu, Camelia Jianu	215
<b><u>The Effect of Diamond Particle Size on the Wear Resistance of Silver/diamond Electroplated</u> <u><b>Dispersion Coatings</b></u> <i>I. V. Rigou, G. Marginean, D. Frunzaverde, C. V. Campian</i></b>	219
<b>Optimization of Elastic and Inelastic Conical Shells of Piece Wise Constant Thickness</b> J. Lellep, E. Puman	223
Analytical Calculations of the Characteristic Impedances in Arteries Using MAPLE Davinson Castano Cano	229
Modelling on Pedestrian Accidents in Malaysia	

Tourism in Novi Sad     Radovan Tomic, Dragica Tomic, Tamara Gajic     Belgrade as a Tourism Destination: Strategic Management Aspects     Nina Djurica, Gordana Tomic, Maja Djurica	esigning Website Application for Family Decision Trip	239
Tourism in Novi Sad Radovan Tomic, Dragica Tomic, Tamara GajicBelgrade as a Tourism Destination: Strategic Management Aspects254Nina Djurica, Gordana Tomic, Maja Djurica254Integration of Load Carriers in a Decentralized Routing Concept for Transport Logistics259Networks259	arim Fraoua	
Tourism in Novi Sad Radovan Tomic, Dragica Tomic, Tamara GajicBelgrade as a Tourism Destination: Strategic Management Aspects254Nina Djurica, Gordana Tomic, Maja Djurica254Integration of Load Carriers in a Decentralized Routing Concept for Transport Logistics259Networks259	xamination of Tourist Satisfaction Quality of Key Resources for the Development of Cultural	246
Belgrade as a Tourism Destination: Strategic Management Aspects   254     Nina Djurica, Gordana Tomic, Maja Djurica   254     Integration of Load Carriers in a Decentralized Routing Concept for Transport Logistics   259     Networks   259		
Nina Djurica, Gordana Tomic, Maja Djurica     Integration of Load Carriers in a Decentralized Routing Concept for Transport Logistics   259     Networks	adovan Tomic, Dragica Tomic, Tamara Gajic	
Integration of Load Carriers in a Decentralized Routing Concept for Transport Logistics     259       Networks     259	elgrade as a Tourism Destination: Strategic Management Aspects	254
<u>Networks</u>	ina Djurica, Gordana Tomic, Maja Djurica	
	tegration of Load Carriers in a Decentralized Routing Concept for Transport Logistics	259
Bernd Scholz-Reiter, Christian Zabel	etworks	
	ernd Scholz-Reiter, Christian Zabel	
Influences of Communication Disruptions on Decentralized Routing in Transport Logistics 265	fluences of Communication Disruptions on Decentralized Routing in Transport Logistics	265
Bernd Scholz-Reiter, Christian Zabel	ernd Scholz-Reiter, Christian Zabel	
The Impact of Roads Network Expansion on Agricultural Development: A Review Study of Al- 271	he Impact of Roads Network Expansion on Agricultural Development: A Review Study of Al-	271
Qassim Region in Saudi Arabia	<u>assim Region in Saudi Arabia</u>	
Mohammed Aldagheiri	ohammed Aldagheiri	
<b><u>Romania, Tourism and Culture - Major Drivers of Regional Attractiveness</u> 277</b>	omania, Tourism and Culture - Major Drivers of Regional Attractiveness	277
Mirela Mazilu	irela Mazilu	
Urban Tourism Planning Emphasizing on Urban Sustainable Development 287	rban Tourism Planning Emphasizing on Urban Sustainable Development	287
Alireza Estelaji, Hadi Sadeghian, Zahra Beyhaghi	ireza Estelaji, Hadi Sadeghian, Zahra Beyhaghi	
		293
Estimation in Hyderabad, India		
Bhuvanachithra Chidambaram, Dimitrios Zikos	uvanachithra Chidambaram, Dimitrios Zikos	
		299
Sucidava Fortress		
Iulian Dinca, Camelia Teodorescu, Stelian Nistor, Liviu Bucur, Ribana Linc	lian Dinca, Camelia Teodorescu, Stelian Nistor, Liviu Bucur, Ribana Linc	
		305
the City of Turin, Italy		
Luca Staricco	ica Staricco	
		310
Romania)		
Luminita Filimon, Paul Olau, Valentin Nemes	iminita Filimon, Paul Olau, Valentin Nemes	
		316
<u>as Wandering Tourism Product</u> Rodica Petrea, Claudiu Filimon, Luminita Filimon, Paul Olau		
κοαι <i>ca τ επεά, C</i> ιαμαία Γιαπιοπ, Lumania Γιαπιοπ, Γάμι Οιάμ	λαιθα Γειτεα, Οιαιααία Γιαπιοπ, Εαπαπιαά Γιαπιοπ, Γαμί Οιαα	
<u>Protected Areas in Hungary and Romania, Bases for the Development of a Sustainable Tourism –</u> 322 A Comparative Preliminary Analisys		322

<u>A Comparative Preliminary Analisys</u> Stelian Nistor, Camelia Teodorescu, Ribana Linc, Iulian Dinca, Liviu Bucur

<mark>Shaping the Future in a Cultural Tourism Market</mark> Aron Jinaru, Alexandru Caragea, George Niculescu	328
Oltcultour Certification Mechanism - Keeping the Right Balance between Authenticity- Traditions-Creativity-Novelty in the Development of Cultural Tourism in Northern Oltenia Region of Romania George Niculescu, Alexandru Caragea, Aron Jinaru	334
<u>The Statistical Analysis of Romanian Tourism in the Context of the World Economic Crisis</u> Mirela Mazilu, Dumitru Bala, Roxana Severineanu	340
Tourism - Revival Factor at Social, Cultural and Economic Levels Mirela Mazilu, Madalina Andrei, Daniela Dumitrescu	347
The Role of Tourism Web in the Development of Historical Cities Case Study: Yazd Historical City Alireza Estelaji, Hadi Sadeghian, Roghaye Ghasemi Darvish Baghal, Seyedeh Leyla Khoda Bakhshi	353
<u>The Birth of a Late Iron Age Fortification. A Preliminary Archaeological and Osteological Approach</u> <u>Approach</u> Vlad Vintila Zirra, Valentin Dumitrascu	359
Traffic Noise Predictive Models Comparison with Experimental Data Claudio Guarnaccia, Tony LL Lenza, Nikos E. Mastorakis, Joseph Quartieri	365
Air Pollution Zoning based on Land use and Traffic of Vehicles Elnaz Irannezhad, Seyed Hossein Mousavi, Mahdieh Zangiabadi	372
<u>The Water Vapor Effect in the Gas Emissions</u> Charalampos Arapatsakos, Achilleas Dratzidis, Anastasios Karkanis	377
<u>The Effect of Fuel Gases in Air Pollutant</u> Charalampos Arapatsakos, Anastasios Karkanis, Marianthi Moschou, Ioannis Pantokratoras	385
The Gas Emissions in Relation to Temperature and rpm Charalampos Arapatsakos, Dimitrios Christoforidis	392
<u>An Integrated Prediction Model to Define the Level of Noise in Urban Areas</u> Federica Crocco, Sergio D'Elia, Domenico W. E. Mongelli	399
A Mathematical Model for Traffic Noise Prediction in an Urban Area Barone Vincenzo, Federica Crocco, Domenico W. E. Mongelli	405
Authors Index	411