



***NORTH ATLANTIC UNIVERSITY UNION***

**Editors: N. Mastorakis, V. Mladenov, Z. Bojkovic**

# **Latest Trends on Theoretical & Applied Mechanics, Fluid Mechanics and Heat & Mass Transfer**

- ◆ **International Conference on  
Theoretical and Applied Mechanics 2010**
- ◆ **International Conference on  
Fluid Mechanics and Heat & Mass Transfer 2010**

**Corfu Island, Greece, July 22-24, 2010**

**ISSN: 1792-4359**

**ISBN: 978-960-474-211-0**



# **LATEST TRENDS on THEORETICAL and APPLIED MECHANICS, FLUID MECHANICS and HEAT & MASS TRANSFER**

**International Conference on Theoretical and Applied Mechanics 2010  
International Conference on Fluid Mechanics and Heat & Mass  
Transfer 2010**

**Corfu Island, Greece  
July 22-24, 2010**

Mechanical Engineering Series  
A Series of Reference Books and Textbooks

Published by WSEAS Press  
[www.wseas.org](http://www.wseas.org)

ISSN: 1792-4359  
ISBN: 978-960-474-211-0

# **LATEST TRENDS on THEORETICAL and APPLIED MECHANICS, FLUID MECHANICS and HEAT & MASS TRANSFER**

**International Conference on Theoretical and Applied Mechanics 2010  
International Conference on Fluid Mechanics and Heat & Mass  
Transfer 2010**

**Corfu Island, Greece, July 22-24, 2010**

Mechanical Engineering Series  
A Series of Reference Books and Textbooks

Published by WSEAS Press  
[www.wseas.org](http://www.wseas.org)

**Copyright © 2010, 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>

ISSN: 1792-4359  
ISBN: 978-960-474-211-0



North Atlantic University Union

# **LATEST TRENDS on THEORETICAL and APPLIED MECHANICS, FLUID MECHANICS and HEAT & MASS TRANSFER**

**International Conference on Theoretical and Applied Mechanics 2010  
International Conference on Fluid Mechanics and Heat & Mass  
Transfer 2010**

**Corfu Island, Greece  
July 22-24, 2010**



**Editors:**

Prof. Nikos E. Mastorakis, BULGARIA

Prof. Valeri Mladenov, BULGARIA

Prof. Zoran Bojkovic, SERBIA

**International Program Committee Members:**

Rozhan M. Idrus, MALAYSIA

Andrei G. Fedorov, USA

Fotis Sotiropoulos, USA

Shabaan Abdallah, USA

Oleg V. Vasilyev, USA

Shoaib Usman, USA

Bozidar, Liscic, CROATIA

Tatsuo Inoue, JAPAN

Michiharu Narazaki, JAPAN

George Totten, USA

Lynn Ferguson, USA

Boris Ushakov, RUSSIA

Pavel Krukovsky, UKRAINE

Gareth Thomas, USA

Tamas Reti, HUNGARY

Valery Rudnev, USA

Claudia del Carmen Gutierrez-Torres, MEXICO

Hyung Hee Cho, KOREA

K. P. Sandeep, USA

Jing Liu, CHINA

Aly Elshamy, EGYPT

Rafael Royo, SPAIN

Slawomir Smolen, GERMANY

Junjie Gu, CANADA

C. J. Ho, TAIWAN

Pradip Majumdar, USA

Ivan Kazachkov, SWEDEN

Jeong-se Suh Gyeongsang, KOREA

Abul-Fazal Arif, S. ARABIA

Yizhen Huang, CHINA

Asad Salem, USA

Suman Chakraborty, INDIA

Ahmed Mohammadein, EGYPT

Joakim Wren, SWEDEN

Agis Papadopoulos, GREECE

Hany Mohamed, EGYPT

A. K. Haghi, IRAN

Chin-Hsiang Cheng, TAIWAN

Aydin Misirlioglu, TURKEY

Valeri Bubnovich, CHILE

Dragoljub Mirjanic, BOSNIA AND

HERZEGOVINA

Hossein Shokouhmand, IRAN

Ramil Sharafutdinov, RUSSIA

Gónter K. F., GERMANY

Kadir Bilen, TURKEY

Federico Mendez, MEXICO

Yinping Zhang, P.R. CHINA

C. W. Leung, HONG KONG

M. Abu-Zaid, JORDAN

Somchai Wongwises, THAILAND

Chun-I Chen, TAIWAN

Mohd Al-Nimr, JORDAN

Mehmet C. Ece, TURKEY

Md Anwar, BANGLADESH

Ali J. Chamkha, KUWAIT

C. Trevipo, MEXICO

Aroudam El hassan, MAROCCO

P. V. S. N. Murthy, INDIA

H. S. Takhar, UK

Federico Mendez, MEXICO

Nickolay Smirnov, RUSSIA

Olga Martin, ROMANIA

Xiaojing Zheng, CHINA





# Table of Contents

<b><u>Iterative Imposing Near Wall Logarithmic Velocity Profile in Turbulent Flow Pressure Modeling over Cylindrical for Unstructured Triangular Meshes</u></b>	9
<i>Saeed-Reza Sabbagh-Yazdi, Fatemeh Namazi-Saleh</i>	
<b><u>Thermal Control of Flow Characteristics inside Vertically-Oriented Plane Sudden Expansions</u></b>	15
<i>Essam Wahba</i>	
<b><u>Performance Analysis of Solar Air Heater By Extended Heat Transfer Surfaces</u></b>	21
<i>P. C. Tiwade, N. R. Pathare</i>	
<b><u>Heat Transfer over an Unsteady Stretching Sheet in a Micropolar Fluid with Prescribed Surface Heat Flux</u></b>	26
<i>N. Bachok, A. Ishak, R. Nazar</i>	
<b><u>Marangoni-Driven Boundary Layer Flow in Nanofluids</u></b>	32
<i>N. M. Arifin, R. Nazar, I. Pop</i>	
<b><u>Initial Design of Very Light Jet with Unconventional Arrangement</u></b>	36
<i>Purwo Kadarno, Siti Zawiah Md. Dawal, T. M. Yusoff Shah Tuan Ya, Khairi Yusuf, Nukman Yusoff, Prasetyo Edi</i>	
<b><u>Changes of Spatial Patterns of Surface-Air-Temperature on the Tibetan Plateau</u></b>	42
<i>Mingyuan Du, Jingshi Liu, Xianzhou Zhang, Yingnian Li, Yanhong Tang</i>	
<b><u>Observations and Numerical Simulations of Windbreak Effects on Surface Temperature</u></b>	48
<i>Mingyuan Du, Tomoki Ushiyama, Taichi Maki</i>	
<b><u>Optimizing Surface Tension in Two Phase Flow with using Levenberg-Marquardt'S Method</u></b>	53
<i>Mohammad Reza Mahpeykar, Edris Yousefirad, Ali Reza Mohammadi</i>	
<b><u>Numerical Simulation of Unsteady Flow with Vortex Shedding Around Circular Cylinder</u></b>	62
<i>Ali Kianifar, Edris Yousefi Rad</i>	
<b><u>Ideal Detonation Characteristics of Biogashydrogen and -Hydrogen Peroxide Mixtures</u></b>	69
<i>Khalid M. Saqr, Hassan I. Kassem, Mohsin M. Sies, Mazlan A. Wahid</i>	
<b><u>Performance of RANS Turbulence Models in Predicting Strained Flows in a Curved Duct</u></b>	73
<i>Hassan I. Kassem, Hossam S. Aly, Khalid M. Saqr, Mohsin M. Sies, Mazlan A. Wahid</i>	
<b><u>Single Pulse Detonation Study of Natural Gas</u></b>	78
<i>Ahmad Faiz M. Z., Mazlan A. Wahid, Khalid M. Saqr, Haffis U.</i>	
<b><u>Large Eddy Simulation of Shear-Driven Vortex Flow in a Cylindrical Cavity</u></b>	84
<i>Khalid M. Saqr, Hossam S. Aly, Hassan I. Kassem, Mohsin M. Sies, Mazlan A. Wahid</i>	
<b><u>Several Intensive Steel Quenching Models for Rectangular Samples</u></b>	88
<i>M. Buike, A. Buikis</i>	



<b><u>Complete Blow-Up for a Degenerate Semilinear Parabolic Problem with a Localized Nonlinear Term</u></b>	94
<i>P. Sawangtong, B. Novaprateep, W. Jumpen</i>	
<b><u>Conceptual Design of Fuselage Structure of Very Light Jet Aircraft</u></b>	100
<i>Khairi Yusuf, Nukman Y., S. Z. Dawal, Devi Chandra, N. Sofia</i>	
<b><u>Control Strategy for Car Active Suspension</u></b>	107
<i>Ales Kruczek, Antonin Stribrsky, Jaroslav Honcu, Martin Hlinovsky</i>	
<b><u>Flow of a Micropolar Fluid in Channel with Heat and Mass Transfer</u></b>	112
<i>Precious Sibanda, Faiz Ga Awad</i>	
<b><u>Sea Surface Roughness and Drag Coefficient under free Convection Conditions</u></b>	121
<i>C. H. Huang</i>	
<b><u>Merging of Sheet Plumes in Turbulent Convection</u></b>	128
<i>G. S. Gunasegarane, Baburaj A. Puthenveetil</i>	
<b><u>Forced Convection Heat Transfer in the Transition Region between Laminar and Turbulent Flow for a Vertical Circular Tube</u></b>	132
<i>D. Huber, H. Walter</i>	
<b><u>Integral Rational Spline with Jump for Discontinuous Mathematical Problems in Layered Media</u></b>	137
<i>S. Kostjukova, A. Buikis</i>	
<b><u>Hyperbolic Heat Equation in Bar and Finite Difference Schemes of Exact Spectrum</u></b>	142
<i>A. Buikis, H. Kalis</i>	
<b><u>Experimental Evaluation of Heat Transfer on Falling Film Tube Bundles in Atmospheric Pressure</u></b>	148
<i>Jiri Pospisil, Libor Chroboczek, Zdenek Fortelny</i>	
<b><u>Authors Index</u></b>	153