Recent Advances in Mechanics, Fluid Mechanics, Heat and Mass Transfer

Proceedings of the 2014 International Conference on Mechanics, Fluid Mechanics, Heat and Mass Transfer

Interlaken, Switzerland, February 22-24, 2014

Edited by

Myriam Lazard Olga Martin Pradip Majumdar

Recent Advances in Mechanical Engineering Series - 9

RECENT ADVANCES in MECHANICS, FLUID MECHANICS, HEAT and MASS TRANSFER

Proceedings of the 2014 International Conference on Mechanics, Fluid Mechanics, Heat and Mass Transfer (MFMHMT 2014)

> Interlaken, Switzerland February 22-24, 2014

RECENT ADVANCES in MECHANICS, FLUID MECHANICS, HEAT and MASS TRANSFER

Proceedings of the 2014 International Conference on Mechanics, Fluid Mechanics, Heat and Mass Transfer (MFMHMT 2014)

Interlaken, Switzerland February 22-24, 2014

Copyright © 2014, by the editors

All the copyright of the present book belongs to the editors. 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 editors.

All papers of the present volume were peer reviewed by no less than two independent reviewers. Acceptance was granted when both reviewers' recommendations were positive.

Recent Advances in Mechanical Engineering Series - 9

ISSN: 2227-4596 ISBN: 978-1-61804-220-0

RECENT ADVANCES in MECHANICS, FLUID MECHANICS, HEAT and MASS TRANSFER

Proceedings of the 2014 International Conference on Mechanics, Fluid Mechanics, Heat and Mass Transfer (MFMHMT 2014)

> Interlaken, Switzerland February 22-24, 2014

Organizing Committee

General Chairs (EDITORS)

- Professor Myriam Lazard Institut Superieur d'Ingenierie de la Conception 27 rue d'Hellieule, 88100 Saint Die France
- Professor Olga Martin Applied Sciences Faculty, Politehnica University of Bucharest, Romania
- Professor Pradip Majumdar
 Department of Mechanical Engineering
 Northern Illinois University
 Dekalb, Illinois 60115, USA

Senior Program Chair

Professor Gen Qi Xu
 Department of Mathematics,
 Tianjin University, Tianjin, China

Program Chairs

- Prof. Karel Frydrysek Technical University of Ostrava, Ostrava - Poruba, Czech Republic
- Professor K. E. Vogiatzis
 Civil Engineering Department
 University of Thessaly
 Greece
- Professor Pavla Bukovska Department of Metal and Timber Structures, Brno University of Technology Czech Republic

Tutorials Chair

Professor Pradip Majumdar
 Department of Mechanical Engineering
 Northern Illinois University
 Dekalb, Illinois, USA

Special Session Chair

 Professor Olga Martin Applied Sciences Faculty, Politehnica University of Bucharest, Romania

Workshops Chair

Professor Gen Qi Xu
 Department of Mathematics,
 Tianjin University, Tianjin, China

Local Organizing Chair

 Professor Jan Awrejcewicz, Technical University of Lodz, Lodz, Poland

Publication Chair

 Professor Olga Martin Applied Sciences Faculty, Politehnica University of Bucharest, Romania

Steering Committee

- Professor Aida Bulucea, University of Craiova, Romania (Chair)
- Professor Marcela Karmazínová, University of Technology, Brno, Czech Republic
- Professor Jan Awrejcewicz, Technical University of Lodz, Lodz, Poland
- Dr. Claudio Guarnaccia, Department of Industrial Engineering, University of Salerno, Italy

Program Committee

Prof. A. C. Benim, Duesseldorf University of Applied Sciences, Duesseldorf, Germany Prof. Mikhail Itskov, RWTH Aachen University, Germany Prof. George G. Tsypkin, Russian Academy of Sciences, Russia Prof. Ahmed Hassan, Assuit University, Assuit, Egypt Prof. Beghidja Abdelhadi, Noisy le Grand, France Prof. Bodo Ruck, University of Karlsruhe, Germany Prof. Bouhadef Malek, Universite des Sciences et de la Technologie Houari Boumediene, Alger, Algeria Prof. Khaled Alhussan, King Abdulaziz City for Science and technology, S.Arabia Prof. Krish Thiagarajan, The University of Western Australia, Australia Prof. Luis Cortez, Cidade Universitaria Zeferino Vaz, Campinas, Sao Paolo, Brazil Prof. Mahmoud Jamiolahmady, Heriot-watt University, Edinburgh, UK Prof. Muthukumaran Packirisamy, Concordia University, Montreal, Quebec, Canada Prof. Nicolas Galanis, University de Sherbrooke, Canada Prof. Oh-hyun Rho, Seoul National University, Korea Prof. Olga Mazhorova, Russia Academy of Science, Moscow, Russia Prof. Pablo S. Casas, Depto. de Matematica Aplicada I, E.T.S. de Ingenieros Industriales de Barcelona, Spain Prof. Pascal Roubides, University of Miami, Florida, USA Prof. Roger Grimshaw, Loughborough University, UK Prof. Ryszard Tadeusiewicz, AGH University of Science and Technology, Poland Prof. Serkan Ozgen, Middle East technical University, Ankara, Turkey Prof. Viorel Stoian, University of Craiova, Romania Prof. Vitoriano Ruas, University Pierre et Marie Curie (Paris VI), France Prof. Andrei G. Fedorov, Georgia Institute of Technology, Atlanta, Georgia, USA Prof. Fotis Sotiropoulos, Georgia Institute of Technology, Atlanta, Georgia, USA Prof. Shabaan Abdallah, University of Cincinnati, Ohio, USA Prof. Oleg V. Vasilyev, University of Colorado, CO, USA Prof. Shoaib Usman, University of Missouri-Rolla, USA Prof. Bozidar, Liscic, President of IFHTSE, Zagreb, Croatia Prof. Tatsuo Inoue, Head of the Department at Kyoto University, Kyoto, Japan Prof. Michiharu Narazaki, Utsunomiya University, Utsunomiya, Tochgi, Japan

Prof. Boris Ushakov, State Metallurgical Univ. in Moscow, Russia Prof. Pavel Krukovsky, Ukran. Nat. Academy of Sciences, Kiev, Ukraine Prof. Gareth Thomas, University of California, Berkeley, CA, USA Prof. Tamas Reti, Tech.Univ.of Budapest, Dept. Materials & Techn., Hungary Prof. Claudia del Carmen Gutierrez-Torres, National Polytechnic Institute, Mexico Prof. Hyung Hee Cho, Yonsei University, Seoul, Korea Prof. K. P. Sandeep, North Carolina State University, USA Prof. Jing Liu, Tech.Inst. of Physics & Chemistry, Chin Acad. of Sci, Beijing, China Prof. Aly Elshamy, Menoufia University, Egypt Prof. Rafael Royo, Universidad Politecnica de Valencia, Spain Prof. Slawomir Smolen, Hochschule Bremen University, Germany Prof. Junjie Gu, Dept. of Mech.& Aerosp.Eng, Carleton Univ., Ottawa, Canada Prof. C. J. Ho, Dept. of Mech.l Engin., Cheng Kung University, Tainan, Taiwan Prof. Pradip Majumdar, Northern Illinois University, USA Prof. Ivan Kazachkov, Royal Institute of Technology, Stockholm, Sweden Prof. Jeong-se Suh Gyeongsang, National University, Korea Prof. Abul-Fazal Arif, King Fahd Univ.of Petroleum & Minerals, Dhahran, S. Arabia Prof. Yizhen Huang, Shanghai Jiaotong University, China Prof. Asad Salem, Cleveland State University, USA Prof. Suman Chakraborty, Indian Insititute of Technology, Kharagpur India Prof. Ahmed Mohammadein ,Aswan Faculty of Science, Egypt Prof. Joakim Wren, Linkoping University, Sweden Prof. Agis Papadopoulos, Aristotle University Thessaloniki, Greece Prof. Hany Mohamed, Assiut University, Egypt Prof. Chin-Hsiang Cheng, Dep.Aeron&Astronautics, N. Cheng Kung Univ. Taiwan Prof. Aydin Misirlioglu, Istanbul Technical University, Turkey Prof. Valeri Bubnovich, Universidad de Santiago, Chile Prof. Dragoljub Mirjanic, University of Banja Luka, Bosnia and Herzegovina Prof. Hossein Shokouhmand, University of Tehran, Iran Prof. Ramil Sharafutdinov, Bashkir State University, Bashkortostan Russia Prof. Gunter K.F., Barwolff Inst. of Mathematics, Berlin, Germany Prof. Kadir Bilen, Ataturk Univ, Dept of Mechanical Engineering, Erzurum, Turkey Prof. Federico Mendez, Universidad Nacional Autonoma de Mexico, Mexico Prof. Yinping Zhang, Tsinghua University, P.R. China Prof. C.W. Leung, The Hong Kong Polytechnic University, Hong Kong Prof. M. Abu-Zaid, Faculty of Eng., Mutah Univ., Jordan Prof. Somchai Wongwises, King Mongkut's Univ. of Techn., Thonburi, Thailand Prof. Chun-I Chen, I-Shou University, Taiwan Prof. Mohd Al-Nimr, Jordan University of Science and Technology, Jordan Prof. Mehmet C. Ece, Trakya Universitesi, Edirne, Turkey Prof. Ali J. Chamkha, Public Authority for Applied Education & Training, Kuwait Prof. C. Treviño, Facultad de Ciencias, UNAM, Mexico Prof. Aroudam El hassan, Dept. of Physics, Tetouan, MAarocco Prof. P.V.S.N Murthy, Dept Maths, Indian Inst.ofTechn. Kharagpur, W. Bengal, India Prof. H.S. Takhar, Manchester Metropolitan University, UK Prof. Federico Mendez, Universidad Nacional Autonoma de Mexico, Mexico Prof. Nickolay Smirnov, Moscow M.V. Lomonosov State University, Russia

Additional Reviewers

Matthias Buyle Lesley Farmer Deolinda Rasteiro Sorinel Oprisan Santoso Wibowo Yamagishi Hiromitsu Kei Eguchi Shinji Osada Tetsuya Yoshida Xiang Bai Philippe Dondon José Carlos Metrôlho João Bastos Takuya Yamano Hessam Ghasemnejad Konstantin Volkov **Eleazar Jimenez Serrano** Jon Burley Manoj K. Jha Frederic Kuznik **Stavros Ponis** Ole Christian Boe Imre Rudas Masaji Tanaka Francesco Rotondo **George Barreto** Dmitrijs Serdjuks Andrey Dmitriev Tetsuya Shimamura Francesco Zirilli Minhui Yan Valeri Mladenov Jose Flores James Vance Genqi Xu Zhong-Jie Han Kazuhiko Natori Moran Wang M. Javed Khan Bazil Taha Ahmed Alejandro Fuentes-Penna Miguel Carriegos Angel F. Tenorio Abelha Antonio

Artesis Hogeschool Antwerpen, Belgium California State University Long Beach, CA, USA Coimbra Institute of Engineering, Portugal College of Charleston, CA, USA CQ University, Australia Ehime University, Japan Fukuoka Institute of Technology, Japan Gifu University School of Medicine, Japan Hokkaido University, Japan Huazhong University of Science and Technology, China Institut polytechnique de Bordeaux, France Instituto Politecnico de Castelo Branco, Portugal Instituto Superior de Engenharia do Porto, Portugal Kanagawa University, Japan Kingston University London, UK Kingston University London, UK Kyushu University, Japan Michigan State University, MI, USA Morgan State University in Baltimore, USA National Institute of Applied Sciences, Lyon, France National Technical University of Athens, Greece Norwegian Military Academy, Norway Obuda University, Budapest, Hungary Okayama University of Science, Japan Polytechnic of Bari University, Italy Pontificia Universidad Javeriana, Colombia Riga Technical University, Latvia Russian Academy of Sciences, Russia Saitama University, Japan Sapienza Universita di Roma, Italy Shanghai Maritime University, China Technical University of Sofia, Bulgaria The University of South Dakota, SD, USA The University of Virginia's College at Wise, VA, USA Tianjin University, China Tianjin University, China Toho University, Japan Tsinghua University, China Tuskegee University, AL, USA Universidad Autonoma de Madrid, Spain Universidad Autónoma del Estado de Hidalgo, Mexico Universidad de Leon, Spain Universidad Pablo de Olavide, Spain Universidade do Minho, Portugal

Table of Contents

Plenary Lecture 1: Discrete Lyapunov Controllers for an Actuator in Camless Engines	12
Paolo Mercorelli	
Plenary Lecture 2: EMG-Analysis for Intelligent Robotic based Rehabilitation	13
Thomas Schrader	
Plenary Lecture 3: Atmospheric Boundary Layer Effects on Aerodynamics of NREL Phase	14
VI Windturbine in Parked Condition	
Mohammad Moshfeghi	
Plenary Lecture 4: Laminar and Turbulent Simulations of Several TVD Schemes in Two-	15
<u>Dimensions</u>	
Edisson S. G. Maciel	
Plenary Lecture 5: The Flocking Based and GPU Accelerated Internet Traffic Classification	17
Zhiguang Xu	
Plenary Lecture 6: The State of Civil Political Culture among Youth: Goals and Results of	18
Education	
Irina Dolinina	
On a Scale Invariant Model of Statistical Mechanics and Derivation of Invariant forms of	19
Conservation Equations from Invariant Boltzmann and Enskog Equations	
Siavash H. Sohrab	
Analytical Solutions of Axysimmetric Problems of Compression (Expansion) of Thick-	38
Walled Spherical and Cylindrical Shells Made of Incompressible Viscoplastic Material	
under Action of External Dynamic Loading	
Alexey B. Kiselev	
Tracer Diffusion through Fiber Networks	42
K. Kang, J. K. G. Dhont	
Laminar Natural Convection in a Two-Dimensional Vertical Conical Partially Annular	49
<u>Space</u>	
B. Ould Said, N. Retiel, M. Aichouni	
Mathematical Modeling of Leather Fatliquoring	55
H. Charvátová, D. Janáčová, K. Kolomazník, V. Vašek, R. Drga, P. Mokrejš	
Experimental Investigation of Nozzle Shape Effect on Wall Shear Stress beneath	60
Impinging Round Jet	
B. Montagné, K. Sodjavi, P. Bragança, A. Meslem, M. Kristiawan	

Efficiency Evaluation of VHC: A CFD Comparison Study at Constant Flow Ricardo F. Oliveira, Senhorinha F. Teixeira, Helena C. Marques, José C. Teixeira	68
An Investigation on Development of Cooling Dual Discharge Fan Module Joo-Han Kim, Jung-Moo Seo, In Soung Jung	75
Laminar and Turbulent Simulations of Several TVD Schemes in Two Dimensions – Part I – Results II Edisson S. G. Maciel	79
Thermodynamic Performances of the Turbojet Combustion Chambers – Numerical <u>Evaluation</u> Constantin Rotaru, Mihai Mihaila-Andres, Pericle Gabriel Matei, Raluca Ioana Edu	86
<u>Strength Verification of the Planetary Gear System</u> Jae-Hwan Shim, Sung Gil Han, Yoo In Shin, Chan Heon Yoon, Jeong Se Suh, Chul Ki Song	92
Instability and Interaction of the Tourbillonner Macrostructure with the Boundary Layer in a Cavity Differentially Heated Taloub Djedid, Beghidja Abdelhadi	97
On Spectral Relaxation Method for an MHD Flow and Heat Transfer of a Maxwell Fluid Stanford Shateyi	102
Specific Heat and Volumetric Heat Capacity of Some Saudian Soils as Affected by Moisture and Density Nidal H. Abu-Hamdeh	107
Effect of Stent Porosity on Hemodynamics within Cerebral Aneurysm Models: Numerical Study Dai Thanh Phan, Minh Tuan Nguyen, Sang-Wook Lee	112
Investigation of Turbulence Characteristics of Burning Process of the Solid Fuel in BKZ 420 Combustion Chamber Askarova A. S., Bekmukhamet A., Bolegenova S. A., Beketaeva M. T., Maximov Yu. V., Ospanova Sh.	116
Atmospheric Boundary Layer Effects on Aerodynamics of NREL Phase VI Wind Turbine in Parked Condition Mohammad Moshfeghi, Nahmkeon Hur	121
Dynamics of Shock Oscillation across Second Throat of a Supersonic Diffuser under Geometry Variation Jintu K. James, Muruganandam T. M.	127

A Study of the Pressure and Potential Distribution by Two Model From Micro Fluidic	132
<mark>Devices</mark> Maryam Ghelichkhani	
Optimum Seismic Isolation System Design for Retrofitting and Upgrading Existing	135
Concrete Bridges	
Mohammad Al Hamaydeh, Nader Aly	
A Study of Pressure Distribution Droplets Motion in Convergence-Divergence Shape	140
<u>Microchannel</u>	
Maryam Ghelichkhani	
Design of Heat Exchanger	144
Ahmed Lajili Ali, Abdulmunam Shaban	
Authors Index	148

Discrete Lyapunov Controllers for an Actuator in Camless Engines



Professor Paolo Mercorelli Leuphana University of Lueneburg Germany E-mail: mercorelli@uni.leuphana.de

Abstract: This paper deals with a hybrid actuator composed by a piezo and a hydraulic part controlled using two cascade Lyapunov controllers for camless engine motor applications. The idea is to use the advantages of both, the high precision of the piezo and the force of the hydraulic part. In fact, piezoelectric actuators (PEAs) are commonly used for precision positionings, despite PEAs present nonlinearities, such as hysteresis, satura- tions, and creep. In the control problem such nonlinearities must be taken into account. In this paper the Preisach dynamic model with the above mentioned nonlinearities is considered together with cascade controllers which are Lyapunov based. The sampled control laws are derived using the well known Backward Euler method. An analysis of the Backward and Forward Euler method is also presented. In particular, the hysteresis effect is considered and a model with a switching function is used also for the controller design. Simulations with real data are shown.

Brief Biography of the Speaker: Paolo Mercorelli received the (Laurea) M.S. degree in Electronic Engineering from the University of Florence, Florence, Italy, in 1992, and the Ph.D. degree in Systems Engineering from the University of Bologna, Bologna, Italy, in 1998. In 1997, he was a Visiting Researcher for one year in the Department of Mechanical and Environmental Engineering, University of California, Santa Barbara, USA. From 1998 to 2001, he was a Postdoctoral Researcher with Asea Brown Boveri, Heidelberg, Germany. From 2002 to 2005, he was a Senior Researcher with the Institute of Automation and Informatics, Wernigerode, Germany, where he was the Leader of the Control Group. From 2005 to 2011, he was an Associate Professor of Process Informatics with Ostfalia University of Applied Sciences, Wolfsburg, Germany. In 2010 he received the call from the German University in Cairo (Egypt) for a Full Professorship (Chair) in Mechatronics which he declined. In 2011 he was a Visiting Professor at Villanova University, Philadelphia, USA. Since 2012 he has been a Full Professor (Chair) of Control and Drive Systems at the Institute of Product and Process Innovation, Leuphana University of Lueneburg, Lueneburg, Germany.

Research interests: His current research interests include mechatronics, automatic control, signal processing, wavelets; sensorless control; Kalman filter, camless control, knock control, lambda control, robotics.

The full paper of this lecture can be found on page 19 of the Proceedings of the 2014 International Conference on Circuits, Systems and Control, as well as in the CD-ROM proceedings.

EMG-Analysis for Intelligent Robotic based Rehabilitation

Professor Thomas Schrader University of Applied Sciences Brandenburg Germany E-mail: thomas.schrader@computer.org

Abstract: The establishment of wireless sensor network (WSN) technology in physiotherapy and rehabilitation is a clue for improvement of the thera- peutic process, quality assessment and development of supporting tech- nologies such as robotics. Especially for complex therapeutic interventions such as sensorimotor training, a continuous monitoring during the ther- apy as well as for all sessions would be quite useful. For the usage of robotic support in rehabilitation various input informa- tion about the status of patient and his/her activity status of various muscles have to be detected and evaluated. The critical point for robotic intervention is the response time. Under physiotherapeutic and rehabilita- tion conditions, the robotic device should be able to react differently and in various patterns. A complex analysis procedure of input signals such as EMG is essential to ensure an effective response of the robot. However sensor nodes in a wireless (body) area network have limited resources for calculating and storage processes. A stepwise procedure with distributed analysis tasks is proposed. Electromyogram (EMG) measurements of eight muscles were collected and evaluated in an experimental setting of a sensorimotor training using different types of balance boards. Fast and easy methods for detection of activity and rest states based on time domain analysis using low pass IIR filter und dynamic threshold adaption. These procedures can be done on the sensor nodes themselves or special calculation nodes in the network. More advanced methods in frequency domain or analysis of dynamical system behavior request much more system power in calculation as well as storage. These tasks could be done on the level of mobile devices such as mobile phones or tablet computer. A broad range of resources can be provided by cloud/internet. Such level based organization of analysis and system control can be compared with biological systems such as human nervous system.

Atmospheric Boundary Layer Effects on Aerodynamics of NREL Phase VI Windturbine in Parked Condition



Professor Mohammad Moshfeghi Sogang University, South Korea E-mail: mmoshfeghi@sogang.ac.kr

Abstract: In a natural condition, the wind is affected by the groundcover and the type of terrains which impose vertical velocity profile to the wind. This wind profile, which is also called atmospheric boundary layer (ABL), dramatically influences the aerodynamic behaviors and loadings of horizontalaxis wind turbines. However, for the sake of simplicity, many numerical simulations only deal with the uniform wind speed. To consider the effects of the ABL, numerical simulations of the two-bladed NREL Phase VI wind turbines aerodynamicat the parked condition are conducted under both uniform and ABL. The Deaves-Harris (DH)model is applied to the ABL. The wind turbine blades are kept at the six o'clock position and are considered at two different pitch angles. The aerodynamic forces and moments of the uniform the DH model are compared. The results show that the pitch angle at which the HAWT is parked conditions, the Down-blade and the blade in the uniform wind are under approximately similar aerodynamic loadings, while the Up-blade encounters more aerodynamic loads, which is even noticeable value for this small wind turbine. This in turn means that for an appropriate and exact design, effects of ABL should be considered with more care.

Brief Biography of the Speaker: Dr. Mohammad Moshfeghi works in Multi-phenomena CFD Engineerng Research Center (ERC) Sogang University, Seoul, South Korea. He is also Lecturer in Qazvin Azad University. He has a registered patent: "Split-Blade For Horizontal Axis Wind Turbines" (Inventors: Mohammad Moshfeghi, Nahmkeon Hur).

Laminar and Turbulent Simulations of Several TVD Schemes in Two-Dimensions



Professor Edisson S. G. Maciel Federal University of Great Dourados, Brazil E-mail: edisavio@edissonsavio.eng.br

Abstract: This work, first part of this study, describes five numerical tools to perform perfect gas simulations of the laminar and turbulent viscous flow in two-dimensions. The Van Leer, Harten, Frink, Parikh and Pirzadeh, Liou and Steffen Jr. and Radespiel and Kroll schemes, in their first- and second-order versions, are implemented to accomplish the numerical simulations. The Navier-Stokes equations, on a finite volume context and employing structured spatial discretization, are applied to solve the supersonic flow along a ramp in two-dimensions. Three turbulence models are applied to close the system, namely: Cebeci and Smith, Baldwin and Lomax and Sparlat and Allmaras. On the one hand, the second-order version of the Van Leer, Frink, Parikh and Pirzadeh, Liou and Sreffen Jr., and Radespiel and Kroll schemes is obtained from a "MUSCL" extrapolation procedure, whereas on the other hand, the second order version of the Harten scheme is obtained from the modified flux function approach. The convergence process is accelerated to the steady state condition through a spatially variable time step procedure, which has proved effective gains in terms of computational acceleration (see Maciel). The results have shown that, with the exception of the Harten scheme, all other schemes have yielded the best result in terms of the prediction of the shock angle at the ramp. Moreover, the wall pressure distribution is also better predicted by the Van Leer scheme. This work treats the laminar first- and second-order and the Cebeci and Smith second- order results obtained by the five schemes.

Brief Biography of the Speaker: Professor Edisson Sávio de Góes Maciel was born in Recife, Pernambuco, Brazil in 1969, February, 25. He studied in Pernambuco until obtains his Master degree in Thermal Engineering, in 1996, August. With the desire of study aerospace and aeronautical problems using numerical methods as tools, he obtains his Doctor degree in Aeronautical Engineering, in 2002, December, in ITA and his Post-Doctor degree in Aerospace Engineering, in 2009, July, also in ITA. He is currently Professor at UFGD (Federal University of Great Dourados) – Mato Grosso do Sul – Brasil. He is author in 47 papers in international journals, 2 books, 67 papers in international conference proceedings. His research interestes includes a) Applications of the Euler equations to solve inviscid perfect gas 2D and 3D flows (Structured and unstructured discretizations) b) Applications of the Navier-Stokes equations to solve viscous perfect gas 2D and 3D flows (Structured and unstructured discretizations) c) Applications of the Euler and Navier-Stokes to solve magneto gas dynamics flows 2D and 3D; (Structured and unstructured discretizations) d) Applications of algebraic, one-equation, and two-equations turbulence models to predict turbulent effects in viscous 2D flows (Structured and unstructured discretizations), e) Study of artificial dissipation models to centered schemes in 2D and 3D spaces (Structured and unstructures discretizations) f)Applications of the Euler and Navier-Stokes equations to solve reentry flows in the Earth atmosphere and entry flows in Mars atmosphere in 2D and 3D (Structured and unstructured discretizations).

The full paper of this lecture can be found on page 79 of the present volume, as well as in the CD-ROM proceedings.

The Flocking Based and GPU Accelerated Internet Traffic Classification



Professor Zhiguang Xu Valdosta State University USA E-mail: zxu@valdosta.edu

Abstract: Mainstream attentions have been brought to the issue of Internet traffic classification due to its political, economic, and legal impacts on appropriate use, pricing, and management of the Internet. Nowadays, both the research and operational communities prefer to classify network traffic through approaches that are based on the statistics of traffic flow features due to their high accuracy and improved robustness. However, these approaches are faced with two main challenges: identify key flow features that capture fundamental characteristics of different types of traffic in an unsupervised way; and complete the task of traffic classification with acceptable time and space costs. In this paper, we address these challenges using a biologically inspired computational model that imitates the flocking behavior of social animals (e.g. birds) and implement it in the form of parallel programs on the Graphics Processing Unit (GPU) based platform of CUDA from NVIDIA[™]. The experimental results demonstrate that our flocking model accelerated by GPU can not only effectively select and prioritize key flow features to classify both well-known and unseen network traffic into different categories, but also get the job done significantly faster than its traditional CPU-based counterparts due to the high magnitude of parallelism that it exhibits.

Brief Biography of the Speaker: Prof. Zhiguang Xu received his Ph.D. in Computer Science from University of Central Florida, FL, USA in 2001. He is currently Professor of Computer Science in the Department of Math and Computer Science at Valdosta State University, GA, USA. His research and teaching interests include Computer Networking, Artificial Intelligence, Parallel and Distributed Computing, and Computer Science Education. Professor Xu is author or co-author of more than 25 published papers in refereed journals or conference proceedings. He has been awarded many grants from both academic and industrial entities. He is actively serving as committee member, reviewer, or lecturer of many national and international conferences and organizations.

The full paper of this lecture can be found on page 88 of the Proceedings of the 2014 International Conference on Mathematical Methods, Mathematical Models and Simulation in Science and Engineering, as well as in the CD-ROM proceedings.

The State of Civil Political Culture among Youth: Goals and Results of Education



Professor Irina Dolinina Perm National Research University, Russia E-mail: irina_edu@mail.ru

Abstract: Political culture is viewed as a phenomenon of social reality. Attitudes toward it (its meaning or significance) are historically conditioned. This research studies enduring presuppositions about (dispositions toward) society and the state, and how these are reflected in conscious stereotypes and cognitive structures among young people within the sociocultural mechanisms that form and modify the basic characteristics of political culture.

Brief Biography of the Speaker: Prof. Irina Dolinina was born in 1960, in Perm, Russia. She is Team Leader in the Research Project «Formation of the political culture of the students», and Professor of Philosophy and Law of the Faculty of Humanities, Perm National Research Technical University since 2012. She has received a lot of honors and awards (2012 - Diploma of the All-Russian Roswitha fund national education and the Education Committee of the State Duma of the Federal Assembly of the Russian Federation. 2013 - Diploma of the All-Russian Roswitha fund national education Committee of the State Duma of the Russian Federation. Diploma-Russian contest "Best Science Book in the humanitarian sphere - 2013). Prof. Dolinina has various progessional organizations and activities.

(Expert on the legislative activities of the Council of Federation of Russia. Board member of the Interregional Association "For civic education." Director of the Research Centre of the political culture).

The full paper of this lecture can be found on page 57 of the Proceedings of the 2014 International Conference on Educational Technologies and Education, as well as in the CD-ROM proceedings.