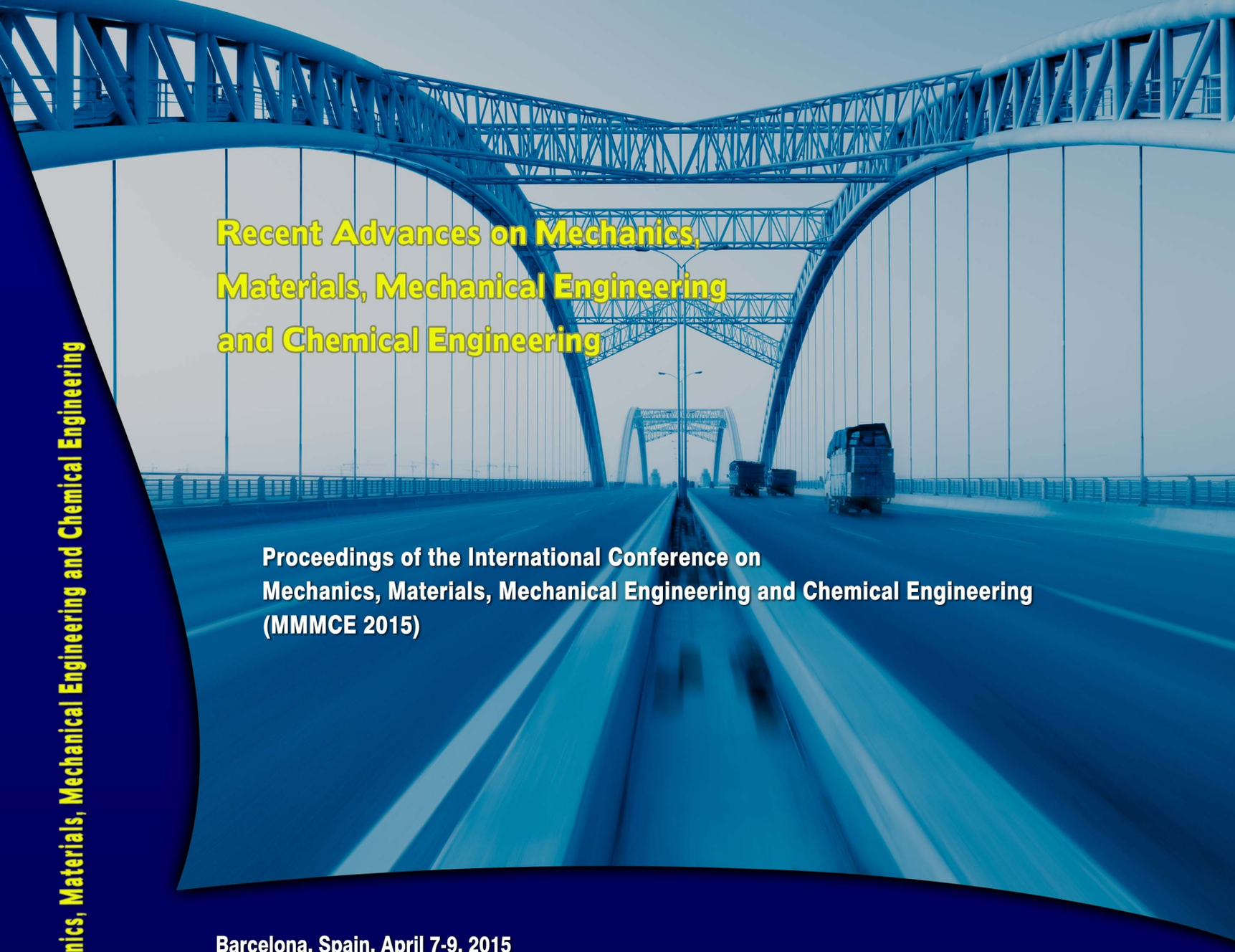

Recent Advances on Mechanics, Materials, Mechanical Engineering and Chemical Engineering

Proceedings of the International Conference on Mechanics, Materials, Mechanical Engineering and Chemical Engineering (MMMCE 2015)

Barcelona, Spain, April 7-9, 2015

Edited by

Nikos E. Mastorakis
Imre Rudas
Marina V. Shitikova
Yuriy S. Shmaliy

Recent Advances in Mechanical Engineering Series | 14

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Table of Contents

Plenary Lecture 1

Professor Marina Shitikova
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Abstract: The analytical review of the existing dynamic technical theories of thin-walled beams of open profile is carried out, from which it follows that all papers in the field can be divided into three groups. The papers, wherein the governing set of equations is both hyperbolic and correct from the viewpoint of the physically admissible magnitudes of the velocities of the transient waves resulting from these equations, fall into the first category. The second category involves the articles presenting hyperbolic but incorrect equations from the above mentioned viewpoint, i.e. resulting in incorrect magnitudes of the transient wave velocities. The papers providing the governing system of equations which are not hyperbolic fall into the third group. The simple but effective procedure for checking for the category, within which this or that paper falls in, has been proposed and illustrated by several examples. It has been shown that only the theories of the first group could be used for solving the problems dealing with transient wave propagation, while the theories belonging to the second and third group could be adopted for static problems only. However, in the theories of the first group, only the velocity of the longitudinal-flexural-warping wave has been found correctly, and it is equal to $v_1 = \sqrt{E/\rho}$, where E is the Young modulus and ρ is the density, while these theories produce three shear waves, the velocities of which depend on the geometry of the beam. But the correct theory should provide a researcher with only one shear-torsional wave propagating with the velocity $v_2 = \sqrt{\mu/\rho}$, where μ is the shear modulus. Such a theory has been recently proposed by the authors, and it would be discussed in the last part of the presentation. This theory is based on three-dimentional equations of the theory of elasticity, theory of discontinuities and ray expansions.

Brief Biography of the Speaker: Marina V. Shitikova is a Soros Professor of the Department of Structural Mechanics and a leading Researcher of the Research Center of Dynamics of Solids and Structures at Voronezh State University of Architecture and Civil Engineering in Russia. She received her MEng in Civil Engineering in 1982, a PhD degree in Structural Mechanics in 1987 from Voronezh Civil Engineering Institute, a DSc degree in Solid Mechanics in 1995 from the Institute for Problems in Mechanics, Russian Academy of Sciences and a Professorship in 1995 from Voronezh State University of Architecture and Civil Engineering. Since 1994, she has been an Associate Member of the Acoustical Society of America, since 1995 she has been a Member of the EUROMECH, GAMM, the ASME International, and Russian Association “Women in Science and Education”. She has published more than 200 papers dealing with structural mechanics, vibrations, wave dynamics, and acoustics. Her biography has been included in Who's Who in the World, Who's Who in Science and Technology, 2000 Outstanding Scientists of the 20th Century. She received a Commemorative Medal "1997 Woman of the Year" from the American Biographical Institute. In 1998 she was awarded the Russian President Fellowship for Outstanding Young Doctors of Sciences. Since 2009 she is the Head of the Department of International Education and Cooperation at Voronezh State University of Architecture and Civil Engineering. She was a Fulbright Fellow at Rice University, Houston, Texas in 2007-2008 and a Visiting Professor in different universities.

Plenary Lecture 2

Cloud Robotics

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Abstract: Cloud Robotics is an emerging field within robotics, currently covering various application domains and robot network paradigms. Cloud Robotics was born from the merger of cloud technologies and robotics. Cloud technology-based computing—or simply Cloud Computing—is one of the most dynamically growing areas of Info-Communication Technologies (ICT). The presentation summarizes the basics of cloud computing, namely the main idea, the definition, the cloud model composed of essential characteristics, service models and deployment models. The next part provides a structured, systematic overview of the numerous definitions, concepts and technologies linked to Cloud Robotics and cloud technologies in a broader sense. It also presents a roadmap for the near future, describing development trends and emerging application areas. Cloud Robotics may have a significant role in the future as an explicitly human-centered technology, capable of addressing the dire needs of our society. Finally some cloud robotics projects are discussed. The last part of the presentation summarizes the results and ideas of a new generation internet and Cloud Technology based Virtual Collaboration Arena (VirCA) developed in Hungary and some of its application possibilities in Cloud Robotics. VirCA provides a platform where users can build, share and manipulate 3D content, and collaboratively interact with real-time processes in a 3D context, while the participating hardware and software devices can be spatially and/or logically distributed and connected together via IP network. The 3D content and processes in VirCA can be synchronized with the real world, which allows the combination of reality and virtual world in the collaboration arena.

Brief Biography of the Speaker: Imre J. Rudas graduated from Banki Donat Polytechnic, Budapest in 1971, received the Master Degree in Mathematics from the Eotvos Lorand University, Budapest, the Ph.D. in Robotics from the Hungarian Academy of Sciences in 1987, while the Doctor of Science degree from the Hungarian Academy of Sciences in 2004. He received his first Doctor Honoris Causa degree from the Technical University of Kosice, Slovakia and the second one from “Polytechnica” University of Timisoara, Romania. He is active as a full university professor He served as the President of Budapest Tech from 2003 till 2010. He was elected in 2010 as the President of Obuda University, the successor of Budapest Tech till April 2014. Now he is the Head of the Steering Committee of the University Research and Innovation Center. He is a Fellow of IEEE, Senior AdCom member of Industrial Electronics Society (IES), he served IES as a Vice-President in 2000-2001, he is Board of Governors member of IEE System, Man and Cybernetics Society. He is the Junior Past Chair of IEEE Hungary Section.

He served IFSA (International Fuzzy System Association) as Vice-President and Treasure for a period of 7 years; he had been the President of Hungarian Fuzzy Association for ten years. He serves as an associate editor of some scientific journals, including IEEE Transactions on Industrial Electronics, member of editorial board of Journal of Advanced Computational Intelligence, member of various national and international scientific committees. He is the founder of the IES Sponsored IEEE International Conference Series on Intelligent Engineering Systems (INES), IEEE International Conference on Computational Cybernetics (ICCC), IEEE International Symposium on Computational Intelligence and

Informatics (CINTI, since 2000), IEEE International Symposium on Machine Intelligence and Informatics (SAMI, since 2003), IEEE International Symposium on Intelligent Systems and Informatics (SISY, since 2003), IEEE International Symposium on Applied Computational Intelligence and Informatics (SACI, since 2004), IEEE International Symposium on Logistics and Industrial Informatics (LINDI, since 2007). He has served as General Chairman and Program Chairman of numerous scientific international conferences. His present areas of research activities are Computational Cybernetics, Robotics with special emphasis on Robot Control, Soft Computing, Fuzzy Control and Fuzzy Sets. He has published six books, more than 690 papers in international scientific journal, conference proceedings and book chapters, he has more than 1000 independent citations.