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BOOKLET OF ABSTRACTS - WCNA 2004

MINISYMPOSIUM

INTEGRITY OF DYNAMICAL SYSTEMS

(Theory, Applications and Experiments)
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Faculty of Mechanical Engineering University of Niš
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The fourth World Congress (WCNA-2004) of Nonlinear Analysts held at the Hyatt Regency Orlando (Near Walt Disney World Resort) under the auspices of the International Federation of Nonlinear Analysts (IFNA).

The vision of IFNA and WCNA is:

- *To promote, encourage, and influence more cooperation, understanding, and collaboration in the world community of nonlinear analysts from various diverse disciplines;*
- *To bring together various disciplines that attempt to understand nonlinear phenomena and solve nonlinear problems; and*
- *To help minimize the ever widening gap between the developed and developing countries by providing scientific and technical research assistance in various forms.*

Within this spirit, the International Federation of Nonlinear Analysts was established in 1992, as a transdisciplinary world society.

IFNA sponsors the World Congress of Nonlinear Analysts periodically once in four years.

The previous WCNAs have been held in Tampa, Florida, Athens, Greece, and Catania, Italy and have been attended by more than 1600 participants from 90 countries. The WCNA-2004 has provided a perfect opportunity for collaboration, contacts as well as relaxation. Don't miss the chance to participate in next important scientific event! Remember IFNA membership entitles you to a reduced registration fee for WCNA-2008 in addition to receiving free copies of the journal, Nonlinear Studies (published quarterly). If you are interested in receiving further information concerning the WCNA-2008, please send the following information via email dkermani@fit.edu or by regular mail to:

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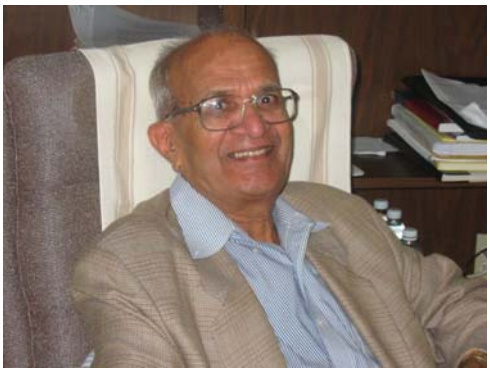

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Preface of the Booklet

The Booklet of the Abstracts contains 16 abstracts of *Invited Lectures* accepted for presentation at the **MINISYMPOSIUM-INTEGRITY OF DYNAMICAL SYSTEMS** (Theory, Applications and Experiments), http://www.masfak.ni.ac.yu/masfak/topic.php?lang=SR&id=525, held in Orlando at Hyatt Regency Orlando (Near Walt Disney World Resort). The Minisymposium was included in the Program of the Fourth World Congress of Nonlinear Analysts - WCNA-2004, June 30-July 7, 2004. Http://kermani.math.fit.edu/.

At the beginning there is a question: *What is the integrity of a dynamical system?* One or more answers, as well as corresponding definitions of the used notions, are needed. Further questions also appear in correlations with the first basic question.

Firstly, let us make some remarks with regard to word *integrity*. The word integrity originates from the Latin word ***integritas*** and has the following meanings: *inviolable*, *untouched state*, *completeness*, *intactness*, *on the whole*, *purity of spirit*, *chastity*, *innocence*.

Also the Latin word ***integrum*** has the following meaning: *untouched totality* (*entirety*). The Latin expression ***in integrum*** has the following meaning: *return in the previous state*, or *in the previous position*.

We have enough reasons to feel ourselves gratified with the content of the invited lectures of this Minisymposium INTEGRITY OF DYNAMICAL SYSTEMS, which witness how the Minysimposium has received active support and extensive attention within academic and engineering communities. This shows that the subject of Integrity of Dynamical Systems is both a basic issue of interest in applied mathematics and a final aim in nonlinear mechanics, with a prosperous vitality and a remarkable progress in recent years.

Vitality and attraction of a research field originate from its social demand. We can point out that twenty years ago, with the rapid development of economy, science and technology people have been facing the challenge of many nonlinear problems. This situation provides ample opportunities for addressing the topic of the Integrity of Dynamical Systems. As a matter of fact, I have been sincerely pleased with my perusing of the content of Minisymposium invited lectures.

I enjoyed pleasant honor and cooperation with the members of the chairmen session: professors Chernousko L. Felix, GIUSEPPE REGA, Ji-Huan He and Hiroshi Yabuno. We are deeply convinced that the overall similarity in the addressed topics and the slight differences in the visual angle of the invited lectures will promote the academic exchanges among all participants, with beneficial effects on both the theoretical and the application point of view. I would like to express my heartfelt gratitude to all of them.

My sincere thanks are also addressed to the Ministry of Science and Life Environmental Protection of Republic of Serbia for the financial support to the organization of the Minysimposium **INTEGRITY OF DYNAMICAL SYSTEMS WCNA 2004.**

Finally, I would like to thank the Centre for Nonlinear Dynamics and Active Structures at the Faculty of Mechanical Engineering University of Niš, for a short-term completion of the **Booklet of Abstracts.**

Nonlinear Mechanics is a subject of great importance in the development of science and technology. The aim of the Symposium is to provide a forum to exhibit the progress in this field during the past years and a place of the further interaction between the modern mechanics and mathematics, as well as the modern engineering sciences. The Symposium is an extraordinary opportunity for scholars to meet and discuss recent advances in Nonlinear Mechanics and their Applications to the issue of Integrity of Dynamical Systems. The participants cover a wide range of expertise, from pure theoreticians to people primarily oriented

towards applications. A significant achievement of the Symposium was, as expected, an extensive in-depth discussion on a variety of topics ranging from highly theoretical questions to practical engineering applications.

The main conclusion that can be drawn from a total of 16 abstracts of lectures presented in this Booklet is that nonlinear mechanics keeps on deserving a great scientific interest as far as both methodology and applicability are concerned.

We can write: "*So what is new in nonlinear dynamics and Mechanics today*? The initial scope of applications in solid mechanics was broadened to cover material processing, inelasticity and fracture mechanics. In the rigid body dynamics, more complex systems such as vehicles, robots and controlled machines have come into the framework of nonlinear dynamics. On the mathematical side of nonlinear dynamics, it is now recognized that spatio-temporal problems, hysteretic and time delay problems are new frontiers in this field. Also the term 'complexity' has been added to the lexicon of the chaos theory to describe the dynamics of many interacting subsystems which can exhibit self-organization and evolution. Complexity analysis has gained a foothold in biological and some social sciences as well as in fluid and chemical physics. It remains to be seen what impact it will have in applied mechanics and engineering.

Here, I would like to express my heartfelt thanks to all members of the scientific Committee, and also to the participants, for their engagement in organizing the Symposium, including the preparation of the manuscripts which will be published in the WCNA IFNA post congress publications (journal).

Finally, on behalf of my colleagues in Serbia and Montenegro, I would like to wish all the Invited participants to the Symposium a warm welcome and thanks.

Katica (Stevanović) Hedrih,
Organizer of the Minisymposium Integrity of Dynamical Systems,
Faculty of Mechanical Engineering University of Niš June 2004.