

## PREFACE

This special issue of the Journal is dedicated to *Nonlinear Mechanics and Nonlinear Sciences with Applications*. It resulted in organization of *Sixth International Symposium on Nonlinear Mechanics Nonlinear Sciences and Applications Niš 2003* (The 6<sup>th</sup> ISNM NSA NIŠ'2003) and by invitation papers and by call for contributed papers in area of nonlinear mechanics as well as of multidisciplinary problems containing common models classified as nonlinear sciences and applications.

The issue contains papers in the area of Mechanics, Mathematics, Electrical Engineering and Applications in Mechanical Engineering, Civil Engineering and Electrical Engineering, and also in fracture and damage mechanics and biomechanics.

This symposium, entitled *Sixth International Symposium on Nonlinear Mechanics Nonlinear Sciences and Applications Niš 2003* (The 6<sup>th</sup> ISNM NSA NIŠ'2003), as was the case with the previous one, entitled '*Nonlinear Sciences at the Threshold of the Third Millenium*', is organized with the wish to unite in a single symposium, on the basis of the *Mathematical Phenomenology of Mihajlo Petrovic Alas*, quite disparate sciences with the aim of integrating the knowledge of the participants of our symposium. This is a serious and long-term task of science.

*How did it all start?* It started here, at the Faculty of Mechanical Engineering, University of Niš.

Prof. dr **Danilo P. Rasković** (Ph.D. in mechanical engineering and BS in mathematics), the first head of the Chair for Mechanics and Automatics, while teaching mechanics at the Department for Mechanical Engineering at the newly founded Faculty of Technical sciences, directed his youngest and most talented students towards studying nonlinear oscillations and nonlinear mechanics. Thereafter, he initiated a cooperation with the academician **Jury Aleksejevitch Mitropolsky** and a leading school of nonlinear mechanics, asymptotic methods and nonlinear oscillations at the Institute for Mathematics in Kiev. That is how a centre for nonlinear mechanics was established at the Chair for Mechanics, Faculty of Mechanical Engineering in Niš. They were supported by the Institute for Mathematics – SANU from Belgrade and by the scientist from all the Universities in Yugoslavia, especially Universities in Belgrade and Novi Sad. The organization of symposiums on nonlinear sciences followed.

The *first symposium on nonlinear mechanics - Nonlinear Dynamics*, organized by YUSM and Serbian Society for Mechanics, was held in Arandjelovac. Prof. Jury Aleksejevitch Mitropolskiy gave the invited plenary lecture. All the members of the Chair for Mechanics and the Chair for Hydraulic Engineering of the Faculty of Mechanical Engineering University of Niš took part in this and other symposiums; they were co-organizers as well.

The *Second Yugoslav Symposium on Nonlinear Mechanics* entitled: "*The First Yugoslav Conference on Nonlinear Deterministic and Stochastic Processes in Dynamical Systems with Applications YCNP Niš'91*", organized by the Faculty of Mechanical Engineering was held in Niš. The Chairman of the Scientific Committee was Prof. dr Veljko Vujičić, while the Chairman of the Organizing Committee was Prof. Katica (Stevanović) Hedrih. Proceedings of Abstracts was printed; the papers and invited lectures which were approved were printed in the first and the following issues of the **University Journal – Facta Universitatis, new Series – Mechanics, Automatic Control and Robotics**. This Series was the third Series, which was being published, besides the *Series Mathematics, Informatics and Electronics, and Energetics*.

William Nash, Kazuyuki Yagasaki ..., gave the invited lectures, at this international symposium.

The invited plenary lectures were given by the following Yugoslav scientists: *Veljko A. Vujičić, Vladan Djordjević, Ljubomir Grujić, Božidar Vujanović, and other..*

Prof. *dr Slobodan Laković*, the Dean of the Faculty of Mechanical Engineering University of Niš and a member of the Organizing Committee, has significantly contributed to the success of this symposium.

The ***Third Yugoslav Symposium on Nonlinear Mechanics*** was held in the form of a *Minisymposium*, as a part of the *XXII Yugoslav Conference on Mechanics in Niš* in 1995. The Faculty of Mechanical Engineering in Niš, with co-organization by the Faculty of Civil Engineering organized this Congress as well.

The Chairman of the Organizing Committee was Prof. *Katica (Stevanović) Hedrih*; Prof. *dr Zoran Boricic*, the Dean of the Faculty of Mechanical Engineering, was very hospitable. Academician *Vladan Djordjević*, the President of YUSM has contributed to the successful organization of this Congress and the Minisymposium. The Chairman of the Scientific Committee was Prof. *dr Veljko Vujičić*. Professors *Yu. A. Mitropolskiy, V.V. Rumyantsev, Felix Chernousko, Anatoliy Martinyuk, Valentina Filchakova, Dan Stamatiu, ...* were guest at this symposium.

The ***Fourth Symposium on Nonlinear Mechanics*** was held in 1997, again in the form of a *Minisymposium*, as a part of the *XIII Yugoslav Congress on Theoretical and Applied Mechanics*. This Congress, held in the Congress Center – Zvezda in Vrnjacka Banja, was organized by the Yugoslav Society for Mechanics. The organization of this Symposium was helped by the Institute for Mathematics – SANU and the Faculty of Mechanical Engineering in Niš and in Belgrade.

The Chairman of the Scientific Committee was the academician *Nikola Hajdin*, and the Chairman of the Organizing Committee was Prof. *Katica Hedrih*. Professors Anthony Kounadis, Giuseppe Rega, Anton Baltov, ... were guest at this symposium.

The ***Fifth Symposium on Nonlinear Mechanics- Nonlinear Sciences at the Threshold of the Third Millenium*** was organized with the wish for it to become a tradition and to gather the connoisseurs of nonlinear phenomenology from disparate sciences and dynamic systems and for it to become renown all over the world.

The Chairmen of the Scientific Committee were academicians *Jury A. Mitropolsky, V. M. Matrosov and V. Vujičić*, and the Chairmen of the Organizing Committee was Prof. *Katica Hedrih and Prof. Z. Boričić*. Academicians N. Hajdin, V.V. Rumyantsev and M. Prvanović and Professors D.S. Sophianopoulos, G.T.Michaltos, Ji Huan He, I. Finogenko, P.S. Krasil'nikov ..... were guests at this symposium.

The year of the Fifth Symposium was the year of the 10<sup>th</sup> **Jubilante issue** of the University Journal – ***Facta Universitatis, new Series – Mechanics, Automatic Control and Robotics***. These symposiums and the Journal *Facta Universitatis* are a permanent characteristic of the University of Niš, Faculty of Mechanical Engineering in Niš and scientific achievements of Yugoslav and Serbian scientists in international relations.

**Katica (Stevanović) Hedrih**  
**Editor-in-Chief**



*Serbian Symposium on Nonlinear Mechanics, Aradlovac, 1984;  
Invited Lecturer Academician RAN and NANU Yu. A. Mitropolskiy (KIEV) in Niš*



*Invited Lecturer: Professor Willam Nash from MTI Masachusetts at Yugoslav Conference on  
Deterministic and Stochastic Processes in Dynamical Systems with Applications Nis 1991*

**THE FIFTH YUGOSLAV SYMPOSIUM ON NONLINEAR MECHANICS -  
NONLINEAR SCIENCES AT THE THRESHOLD OF THE THIRD  
MILLENNIUM (YUSNM NIŠ '2000)**

*held in Niš, Yugoslavia at October 2-5, 2000. at Faculty of Mechanical Engineering, and it  
dedicated to the 40th Anniversary of the Faculty of Mechanical Engineering and  
Faculty of Civil Engineering and Architecture, as well as to the 35th Anniversary of the  
University of Niš. The Symposium is organized under the patronage of the Department of Technical  
Sciences, Serbian Academy of Sciences and Arts.*



*Participants of*

***The Fifth Yugoslav Symposium on Nonlinear Mechanics -  
NONLINEAR SCIENCES AT THE THRESHOLD OF THE THIRD MILLENNIUM  
(YUSNM NIŠ '2000)***

*from Russia, Greece, China, Bulgaria, Rumania, Ukraine and Yugoslavia. mr D. Jovanović (Niš, YU), Professor P. Krasil'nikov (Moscow, Russia), Professor Ji Huan He (Shanghai, China), Professor P. Krasil'nikov (Moscow, Russia), Professor Ji Huan He (Shanghai, China), Academician UHEAS K. Hedrih (Niš, YU), Academician SASA M. Prvanović (Belgrade, YU), Professor G. Michaltsos (Athens, Greece), Z. Vosika (Belgrade YU), Professor D. Sophianopoulos (Athens, Greece), Academician SASA N. Hajdin (Belgrade, YU), Ass. Professor P. Rajković (Niš, YU), Professor G. T. Konstantakopoulos (Athens, Greece), Academician RAS V. Rumyantsev (Moscow, Russia), Professor D. Mikičić (Belgrade, YU), Academician ANS V.A. Vujičić,....*