

NONLINEAR SCIENCE AND COMPLEXITY

Proceedings of the Conference

Beijing, China, 7 – 12 August 2006

edited by **Albert C J Luo** (*Southern Illinois University Edwardsville, USA*), **Liming Dai** (*University of Regina, Canada*), & **Hamid R Hamidzadeh** (*Tennessee State University, USA*)

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This volume provides useful tools in Lie group analysis to solve nonlinear partial differential equations. Many of important issues in nonlinear wave dynamics and nonlinear fluid mechanics are presented: Homotopy techniques are used to obtain analytical solutions; fundamental problems and theories in classic and quantum dynamical systems are discussed; and numerous interesting results about dynamics and vibration in sensor and smart systems are presented. Interval computation and nonlinear modeling in dynamics and control are also briefly included.

Contents:

- Turbulence and Surface Gravity Waves on the Sun (*N Mole et al.*)
- A Fuzzy Blue Sky Catastrophe (*J Q Sun & L Hong*)
- Complex Dynamics in the Trajectory Control of Redundant Manipulators (*B M Fernando Duarte et al.*)
- Nonlinear Dynamics and Optimization of Spur Gears (*F Pellicano et al.*)
- Exact Solutions of a Second Grade Fluid in a Porous Medium (*S Islam & C Y Zhou*)
- Lump Solutions of 2D Generalized Gardner Equation (*Y A Stepanyants et al.*)
- In-Plane Free Vibrations of Compound High Speed Rotating Disks (*H R Hamidzadeh*)
- Nonlinear Dynamical Analysis of Micro Self-Acting Gas Journal Bearing (*H Huang et al.*)
- Nonlinear Characteristics of Magnetorheological Damper under Base Excitation (*Y Li et al.*)
- Spatial Signal Characteristics of Shallow Paraboloidal Shell Structronic System (*H H Yue et al.*)
- Application of Magnetorheological Elastomer to Vibration Control (*H X Deng & X L Gong*)
- and other papers

Readership: Mathematicians, physicists, engineers, researchers and students in mechanical engineering and electrical engineering.

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Preface

This volume partially contains the papers presented in the 2006 *International Conference on Nonlinear Science and Complexity*, which held in Beijing, China, August 7-12, 2006. This conference provided a place to exchange recent developments, discoveries and progresses on *Nonlinear Science and Complexity*. The fundamental and frontier theories and techniques for modern science and technology were presented. In addition, this conference provides a platform to exchange the methodology in applied nonlinear science, nonlinear modeling and intelligent computations. The conference organizers believe this conference to stimulate more research in nonlinear science and complexity. The conference focused on the following topics:

- Lie Group Analysis and Applications in Nonlinear Science Complex (Nail H. Ibragimov)
- Nonlinear Wave Dynamics and Patterns in Geophysical Flows (Lev A. Ostrovsky and Victor I. Shrira)
- Chaotic Dynamics and Transport in Classic and Quantum Systems (Sergey Prants)
- Nonlinear Dynamics, Oscillations and Stability (Albert C.J. Luo, Pei Yu, Subhash Sinha)
- Nonlinear Fluid Mechanics (Gazanfer Unal and Shijun Liao)
- Dynamics in Continuous Media and Wave Propagations (Liming Dai)
- Modeling and Nonlinearity in Sensors, Bio-devices, MEMS and Nano-systems (Frank Z. Feng, G. Nakhaie Jazar)
- Nonlinear Modeling and Control of Smart Material Systems (M.H. Elahinia, Xubin Song)
- Nonlinear Modeling and Control and Intelligent Computing (Zhongliang Jing, Trong Wu)

Many papers presented in this conference show excellent achievements in nonlinear science and complexity. The organizers believes this permanent record will make the work last longer and more influence. The conference organizers wish to express their deep appreciation to all the authors and reviewers.

Albert C.J. Luo, Liming Dai, H.R. Hamidzadeh

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