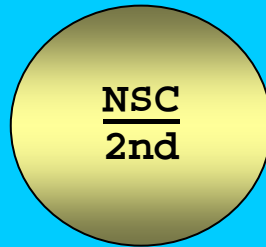


Conference on  
**Nonlinear Science and Complexity**



**July 28-31, 2008**

**Porto, Portugal**

**FINAL PROGRAM**



## Welcome Venue

We welcome you to the 2nd Conference on Nonlinear Science and Complexity, NSC'08. This conference provides a place to exchange recent developments, discoveries and progresses on Nonlinear Science and Complexity. The aims of the conference are to present the fundamental and frontier theories and techniques for modern science and technology, and to stimulate more research interest for exploration of nonlinear science and complexity. The conference focus also on principles, analytical and symbolic approaches, computational techniques in nonlinear physical science and nonlinear mathematics. After a review process by the International Program Committee, 105 papers were selected to be presented involving authors from 30 countries. Furthermore, four plenary talks by known leading specialists have been programmed for the four days of the conference. This confirms that nonlinear science and complexity has become an important issue for the international scientific community in various fields, such as mechanics, physics, electricity, chemistry, biology, economics, control theory and signal processing. This growing activity on nonlinear science and complexity, both from university and industry, supposes a success for this international event gathering and unifying the whole community.

The conference is held in the Institute of Engineering of Porto (ISEP), in the Polytechnic campus of Porto. Our host city, Porto, situated on the banks of the river Douro, is one of the oldest cities in Europe. With a population of about 300.000, it is the country's second most important city in terms of economic output and cultural influence. Porto made its name over two centuries ago because of its connection with the Porto wine industry. It was elected as "Porto 2001: European Capital of Culture" and recently designated by UNESCO as a World Heritage City, a fitting recognition not only for its granite sculpted beauty, but also for the unforgettable panorama of its historic centre with narrow streets and typical houses arrayed like a cascade right down to the river, and for its passionate history which determined the country's destiny. Porto is also at the heart of a knowledge and business intensive region, offering one University, one Polytechnic and several research institutes, which stimulate a strong connection with industry, the service sector and IT enterprises.

We would like to express our gratitude to the International Program Committee, to all the referees, to the invited plenary speakers, to the symposia organizers and to the authors of all papers. We would also like to thank the supporting institutions that allowed the organization of the workshop in the best conditions.

We are very pleased to welcome you to NSC'08 and to wish you a pleasant and enjoyable stay in Porto and in Portugal.

J. A. Tenreiro Machado  
Albert Luo  
George Zaslavsky  
Co-Chairs

## International Program Committee

### Co-Chairs

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Albert Luo  
George Zaslavsky

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Manuel F. Silva (Portugal)  
Lino Figueiredo (Portugal)  
Ramiro Barbosa (Portugal)  
Alexandra Galhano (Portugal)

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Albert Luo (USA)  
Ali Nayfeh (USA)  
António M. Lopes (Portugal)  
Blas Vinagre (Spain)  
Carla Pinto (Portugal)  
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Josep Masdemont (Canada)  
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Juan Trujillo (Spain)  
Kevin Mitchell (USA)  
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Weihua Li (Australia)  
Xavier Leoncini (France)  
YangQuan Chen (USA)  
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## Organizers and Supporters

### Organizing Institution

ISEP – Instituto Superior de Engenharia do Porto

### Supporting Institutions

ISEP – Instituto Superior de Engenharia do Porto

IPP – Instituto Politécnico do Porto

## Venue Location

### ISEP – Instituto Superior de Engenharia do Porto

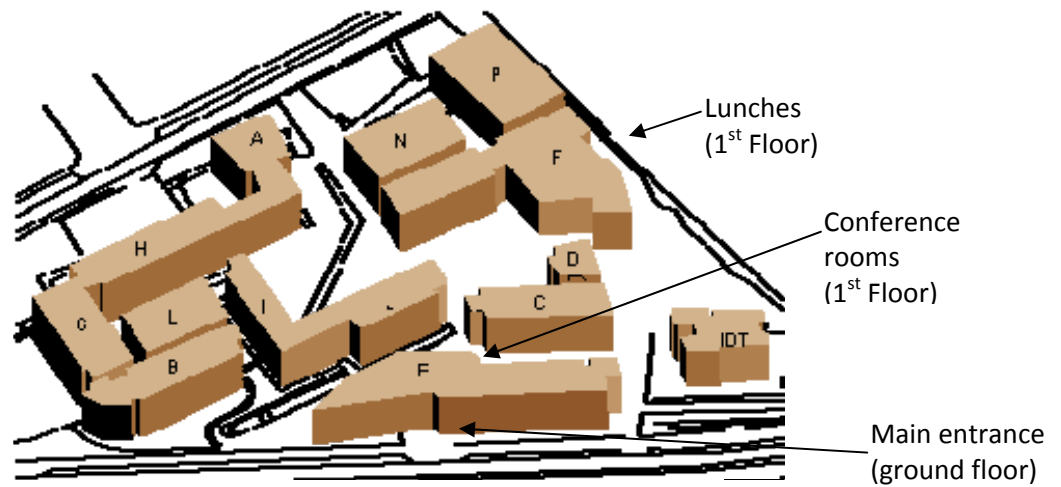
The Institute of Engineering of Porto (ISEP) is located in Porto, in the city's university campus 2 and has over 5.600 students. Each of the School's departments has laboratories and / or research centres that support the development of academic and research projects and render services for the industrial and entrepreneurial community.



### Address and Contacts

Instituto Superior de Engenharia do Porto  
Rua Dr. António Bernardino de Almeida, 431  
4200-072 Porto  
Tel: +351 22 83 40 500  
Fax: +351 22 83 21 159  
<http://www.isep.ipp.pt>

## ISEP Campus Map

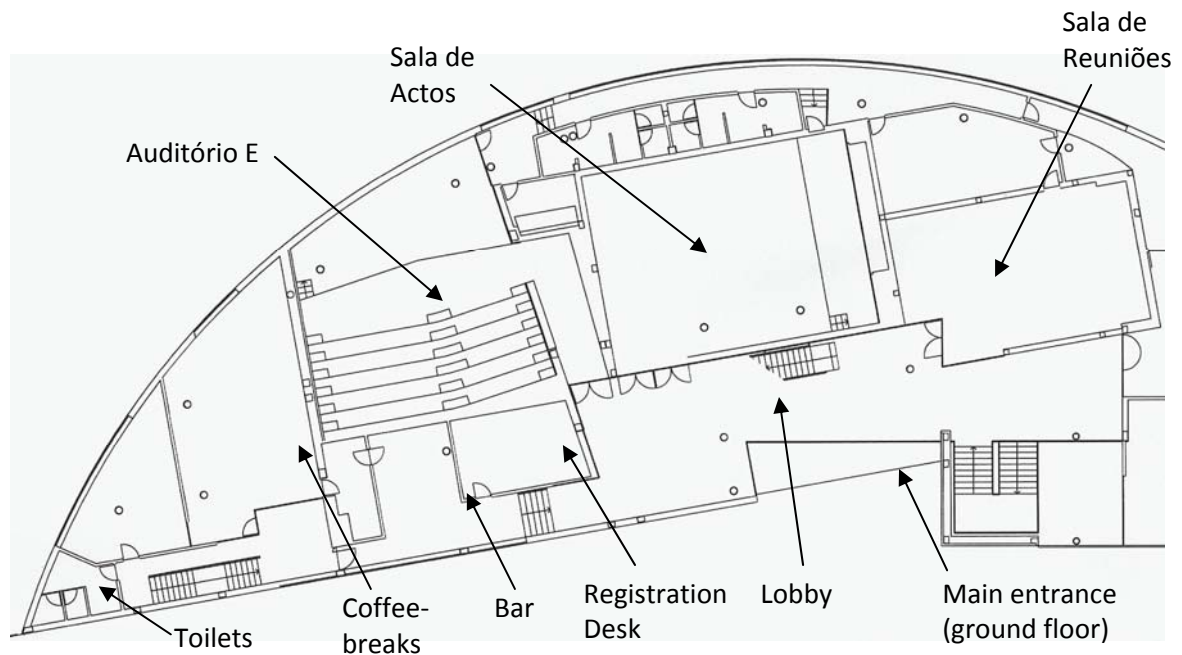


The conference rooms and registration desk are located on the first floor of building **E** (entrance through Rua Dr. António Bernardino de Almeida).

Welcome Reception, Lunches and Farewell Buffet will be at building **F**.

## Congress Facilities

The following map shows the first floor of building **E**, where the conference rooms and registration desk are located.





Lobby that gives access to the conference rooms and other facilities



Conference room 2 (Sala de Actos) - stage view



Plenary conference room (Auditório E) - general view



Conference room 2 (Sala de Actos) - general view



Plenary conference room (Auditório E) - stage view

## Social Program

The normal registration fee for the Conference already includes the Porto Tour and Dinner Banquet on the afternoon and evening of July 30, 2008. Information on the time and place to get the bus to participate on the Porto Tour and on the Dinner Banquet will be available to the participants at the Registration Desk.

Extra tickets to the Porto Tour and Dinner Banquet on the afternoon and evening of July 30, 2008 can be bought for accompanying persons. The fee is 100 Euros.

Besides the Porto Tour included in the Conference Program, there is also available another tour, according to the following planning.

### FÁTIMA TOUR - (Full day)



Departure from Porto with destination to the city of "Fatima" for visit to the Sanctuary Our Lady of the Rosary, an important center of peregrination for the world catholic and the great attraction of this region. The sanctuary of "Fatima" started to be constructed in 1928, height where if it raised the Basilica of the Hollow of Iria, in neo-baroque style, according to one project of architect Dutch G. Van

Kriecken, come to be Sacred in 1953. The high-altar presents stained-glass windows with some of the scenes of the appearances and a picture where the message that Ours Lady transmitted to the little shepherds is represented. After lunch (free), it visits to an only space in Portugal, "Museum of the Wax", that describes in thirty scenes the Appearance of the Virgin Mary to the little shepherds and the most important events of the history of "Fatima" of the last century. The highest figures of the Church also meet here represented. There we have also an opportunity to visit a new "Santíssima Trindade" Church. End of the visit and return to Porto.

**Price for person for a minimum of 20 participants: € 62,50**

## Symposia

### Symp-02

**Title:** Computational Techniques for Engineering Sciences

**Organizers:** Lino Figueiredo, Cecília Reis

Computational techniques, in particular Evolutionary computation is a growing research field of Artificial Intelligence and is divided in two main areas: the Evolutionary Algorithms and the Swarm Intelligence. This special session will highlight applications of evolutionary computation to a broad range of engineering sciences. Authors are invited to submit their original and unpublished work in the areas including (but not limited to) the following:

• Genetic Algorithms • Particle Swarm Optimization • Differential Evolution • Ant Colony Optimization • Hybrid Algorithms • Circuit Synthesis • Intelligent Transportation Systems • Travel and Traffic Management .

### MOGRAN-12

**Title:** Lie group analysis and applications in nonlinear sciences

**Organizer:** Nail Ibragimov

The aim of the session is to highlight applications of Lie group analysis to nonlinear mathematical models in physics, mathematical biology and engineering sciences. The emphasis is in recent developments in new methods on group invariant solutions and conservation laws with applications to nonlinear diffusion and wave phenomena, electromagnetism and fluid dynamics.

### Symp-05

**Title:** Fractional Calculus Applications

**Organizers:** Ramiro Barbosa, Manuel Silva

Fractional calculus (FC) is a field of mathematics that deals with derivatives and integrals to an arbitrary order. It is an old topic that goes back to the XVII century but in which the first real applications appeared only in the second half of the XX century. Nowadays, the FC is applied in most areas of science and engineering, enabling the discovery of new methodologies and the extension of classical results. Authors are invited to submit their original and unpublished work in all areas related with the topic of this special session.

### Symp-06

**Title:** Nonlinear Dynamics of Continuous and Discontinuous Dynamical Systems

**Organizers:** Albert Luo, Pei Yu



## **Symp-08**

**Title:** Celestial Mechanics and Dynamical Astronomy: Methods and Applications

**Organizers:** Josep Masdemont, Marian Gidea

## **Symp-09**

**Title:** Mathematical Modeling of Nonlinear Structures in Bose-Einstein Condensates

**Organizers:** Vladimir Konotop, Dmitry Pelinovsky

The special session aims to highlight recent advances in mathematical modeling of Bose-Einstein condensates with particular emphasis on existence, stability, exact solutions, and dynamics of nonlinear localized structures. The list of invited speakers will include applied mathematicians and theoretical physicists working actively in this area in the past few years and focusing on mathematical aspects of the theory of matter waves. They will talk on localization in traps of complex geometry and explain recent advances in mathematical methods for construction and study of corresponding solutions of Gross-Pitaevskii equations.

## **Symp-11**

**Title:** Mathematical Models in Engineering

**Organizers:** Carla M. A. Pinto, António Mendes Lopes

Mathematical models have been used to explain real-world problems in the natural sciences and engineering disciplines (such as physics, biology, and electrical engineering). Physicists, engineers, computer scientists, and economists use mathematical models in their research works. In this symposium we focus on mathematical models in the form of dynamical systems, statistical models, differential equations and game theoretic models. We believe engineers and applied mathematicians can greatly benefit from close collaboration and enforce links between the academic and the real world. Authors are invited to submit their original and unpublished theoretical, experimental and/or numerical work in the area.

# Conference Program

**Monday, July 28, 2008**

8.30-9.30	Registration		
9.30-10.00	Opening Ceremony		
	<b>Room:</b> Auditório E		
10.00-11.00	Plenary Lecture 1		
	<p><b>Introduction to a Method Solving a Non-Smooth Dynamical System</b></p> <p style="text-align: center;">by Chunqing Lu</p> <p style="text-align: center;">Mathematics and Statistics Southern Illinois University Edwardsville, USA</p> <p style="text-align: center;"><b>Room:</b> Auditório E</p> <p><b>Chair:</b> Albert Luo</p>		
11.00-11h30	Coffee-break		
11h30-13h15		Sala de Actos	Sala de Reuniões
		SYMP-11 I	SYMP-05 I
		Session Mo-SA/1	Session Mo-SR/1
13h15-14h45	Lunch		
14h45-16h30		Sala de Actos	Sala de Reuniões
		SYMP-11 II	SYMP-05 II
		Session Mo-SA/2	Session Mo-SR/2
16h30-17h00	Coffee-break		
17h00-18h45	Auditório E	Sala de Actos	Sala de Reuniões
	Nonlinear Systems	SYMP-11 III	SYMP-06
	Session Mo-AE/1	Session Mo-SA/3	Session Mo-SR/3
20h00-21h00	Welcome Reception		
	<b>Location:</b> First Floor, Building F		

# Conference Program

**Tuesday, July 29, 2008**

8.30-9.00	Registration		
9.00-10.00	Plenary Lecture 2  <b>On Fractional Dynamics and its Applications</b> by Dumitru Baleanu  Department of Mathematics and Computer Science Cankaya University, Ankara, Turkey  <b>Room:</b> Auditório E  <b>Chair:</b> J. A. Tenreiro Machado		
10.00-10h30	Coffee-break		
10h30-12h30	Auditório E SYMP-08 I  Session Tu-AE/1	Sala de Actos MOGRAN-12 I  Session Tu-SA/1	Sala de Reuniões SYMP-09 I  Session Tu-SR/1
12h30-14h30	Lunch		
14h30-16h15	Auditório E Nonlinear Dynamics I  Session Tu-AE/2	Sala de Actos MOGRAN-12 II  Session Tu-SA/2	Sala de Reuniões Chaos I  Session Tu-SR/2
16h15-16h45	Coffee-break		
16h45-18h30	Auditório E Nonlinear Dynamics II  Session Tu-AE/3	Sala de Actos MOGRAN-12 III  Session Tu-SA/3	Sala de Reuniões SYMP-02  Session Tu-SR/3
20h00-21h00	Dinner  <b>Location:</b> First Floor, Building F		
21h30-22h30	“Academic Fados”  <b>Room:</b> Auditório E		

## Conference Program

**Wednesday, July 30, 2008**

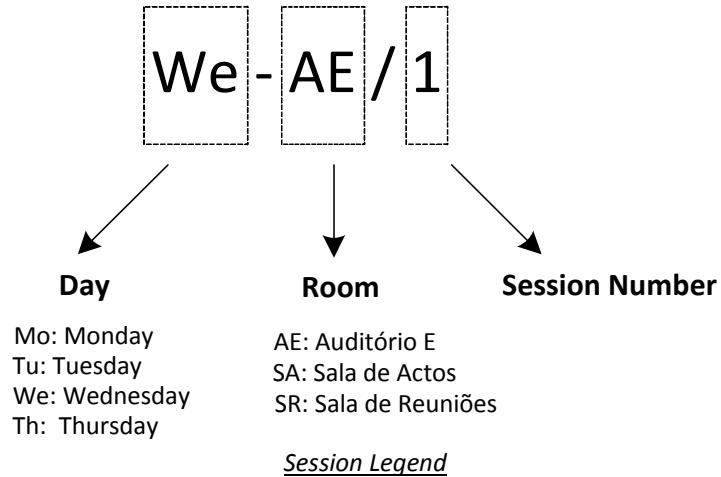
8.30-9.00	Registration		
9.00-10.00	Plenary Lecture 3 <b>Applications of Group Invariance Methods to Nonlinear Problems</b> by Nail Ibragimov Blekinge Institute of Technology Karlskrona, Sweden Room: Auditório E Chair: Dmitry Pelinovsky		
10.00-10h30	Coffee-break		
10h30-12h30	Auditório E SYMP-08 II Session We-AE/1	Sala de Actos MOGRAN-12 IV Session We-SA/1	Sala de Reuniões SYMP-09 II Session We-SR/1
12h30-14h00	Lunch		
14h00-15h00	Student's Poster Session		
15h00-19h30	City Tour Departure Location: to be announced		
20h00-22h30	Conference Banquet Location: Caves Taylor's		

## Conference Program

**Thursday, July 31, 2008**

8.30-9.00	Registration		
9.00-10.00	Plenary Lecture 4  <b>The Skeleton of The Dynamics Provided by Invariant Manifolds of Libration Point Orbits and Some Applications</b> by Josep J. Masdemont  Departament de Matemàtica Aplicada I ETSEIB-UPC, Spain  <b>Room:</b> Auditório E  <b>Chair:</b> Marian Gidea		
10.00-10h30	Coffee-break		
10h30-12h30	Auditório E	Sala de Actos	Sala de Reuniões
		Chaos II	Nonlinear Oscillations
		Session Th-SA/1	Session Th-SR/1
12h30-14h30	Lunch		
14h30-16h15	Auditório E	Sala de Actos	Sala de Reuniões
		SYMP-08 III	Nonlinear Hydrodynamics
		Session Th-SA/2	Session Th-SR/2
18h00-18h30	Closing Ceremony  <b>Room:</b> Auditório E		
19h00-21h00	Farewell Buffet  <b>Location:</b> First Floor, Building F		

# Technical Sessions



## Monday, July 28, 2008

**11h30-13h15**

**Room:** Sala de Actos

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### **SYMP-11: Symposium on Mathematical Models in Engineering (I)**

Organizers: Carla Pinto, António Mendes Lopes

Chairs: Carla Pinto, António Mendes Lopes

#### **Session Mo-SA/1**

##### **Spherical Harmonics, SO(3) Decompositions, Structure Functions and Solar Wind**

Sílvio M. A. Gama

##### **Undesired Oscillations in Pneumatic Systems**

João Falcão Carneiro, Fernando Gomes de Almeida

##### **Applications of Entropy and Neural Models to Predict Oil Flow**

Oswaldo Ludwig, Urbano Nunes, Rui Araújo, Leizer Schnitman, Herman Augusto Lepikson

##### **Impulsive Boundary Layer Flow Past a Linearly Permeable Quadratically Stretching Sheet**

V. Kumaran, A. Vanav Kumar, J. Sarat Chandra Babu

## Technical Sessions

**11h30-13h15**

**Room:** Sala de Reuniões

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### **SYMP-05: Symposium on Fractional Calculus Applications (I)**

Organizers: Ramiro Barbosa, Manuel Silva

Chairs: Ramiro Barbosa, Manuel Silva

#### [Session Mo-SR/1](#)

##### **Mellin Transform for Fractional Differential Equation with Variable Potential**

M. Klimek, D. Dziembowski

##### **The Fractional Quantum Derivative and the Generalised Euler-Cauchy Equation**

Manuel Ortigueira

##### **On Fractional Variational Principles and Fractional Quantization**

D. Baleanu

##### **Regularity of a Degenerated Convolution Semi-Group Without to use the Poisson Process**

Rémi Léandre

**14h45-16h30**

**Room:** Sala de Actos

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### **SYMP-11: Symposium on Mathematical Models in Engineering (II)**

Organizers: Carla Pinto, António Mendes Lopes

Chairs: Carla Pinto, António Mendes Lopes

#### [Session Mo-SA/2](#)

##### **Characterization and Parameterization of the Singular Manifold of a Simple 6-6 Stewart Platform**

Tiago Charters de Azevedo, Pedro Freitas

##### **Dynamic Modeling of a 6-Dof Stewart Platform using the Generalized Momentum Approach**

António M. Lopes

##### **Motifs and Noise in Regulatory Genes Networks**

Fernando Antoneli

## Technical Sessions

### **Rich Phenomena in a Network of Two Rings Coupled through a 'Buffer' Cell**

Fernando Antoneli, Ana Paula S. Dias, Carla M. A. Pinto

**14h45-16h30**

**Room:** Sala de Reuniões

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### **SYMP-05: Symposium on Fractional Calculus Applications (II)**

Organizers: Ramiro Barbosa, Manuel Silva

Chairs: Ramiro Barbosa, Manuel Silva

### **Session Mo-SR/2**

#### **Some Advances on Image Processing by Means of Fractional Calculus**

Eduardo Cuesta

#### **Application of Fractional Algorithms in Control of a Quad Rotor Flight**

J. Coelho, R. Neto, C. Lebres, Vitor Santos, Nuno Ferreira, José Tenreiro Machado

#### **Implementing an Electrical Fractional Potential through a Genetic Algorithm**

Isabel Jesus, José Tenreiro Machado, Ramiro Barbosa

#### **Phase Plane Characteristics of Marginally Stable Fractional Order Systems**

Narges Nazari, Mohammad Haeri, Mohammad Saleh Tavazoei

**17h00-18h45**

**Room:** Auditório E

---

### **Nonlinear Systems**

Chair: Malgorzata Klimek

### **Session Mo-AE/1**

#### **Prediction of Chaos using Inertial RL Circuits**

Arunas Tamasevicius, Gytis Mykolaitis, Skaidra Bumeliene, Elena Tamaseviciute

#### **Bertrand Model Under Incomplete Information**

F. A. Ferreira, A. A. Pinto

#### **Price-Setting Dynamical Model Under Costs Uncertainty**

F. A. Ferreira, F. Ferreira, A. A. Pinto



## Technical Sessions

**17h00-18h45**

**Room:** Sala de Actos

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### **SYMP-11: Symposium on Mathematical Models in Engineering (III)**

Organizers: Carla Pinto, António Mendes Lopes

Chairs: Carla Pinto, António Mendes Lopes

#### [Session Mo-SA/3](#)

##### **A Reduction Type Algorithm for Nonlinear Semi-Infinite Programming**

Alzira Mota

##### **Three Behavioural Scenarios for Contingent Claims Valuation in Incomplete Markets**

D. Pinheiro, A. A. Pinto, S. Z. Xanthopoulos, A. N. Yannacopoulos

##### **A Study of Correlation and Entropy for Multiple Time Series**

José A. O. Matos, Sílvio M. A. Gama

##### **Spectral Solution for the Air Stripping Pollutants Removal Dynamic Model with Non Linear Steady State Conditions**

Ana Cristina Castro, José Matos, Alexandra Gavina

**17h00-18h45**

**Room:** Sala de Reuniões

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### **SYMP-06: Symposium on Nonlinear Dynamics of Continuous and Discontinuous Dynamical Systems**

Organizers: Albert Luo, Pei Yu

Chair: Albert Luo, Pei Yu

#### [Session Mo-SR/3](#)

##### **On Synchronization and its Complexity of Multiple Dynamical Systems**

Albert C. J. Luo

##### **Periodic and Chaotic Motions in a Gear-Pair Transmission System with Impacts**

Albert C. J. Luo, Dennis O'Connor

##### **Analytical Prediction of Interrupted Cutting Periodic Motions in a Machine Tool**

Brandon C. Gegg, Steve Suh, Albert C. J. Luo

## Technical Sessions

### **Control of Hopf Bifurcation and Chaos as Applied to Multimachine System**

Majdi Alomari, Benedykt Rodanski

**Tuesday, July 29, 2008**

**10h30-12h30**

**Room:** Auditório E

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### **SYMP-08: Symposium on Celestial Mechanics and Dynamical Astronomy: Methods and Applications (I)**

Organizers: Josep Masdemont, Marian Gidea

Chairs: Josep Masdemont, Marian Gidea

[Session Tu-AE/1](#)

### **Spacecraft Attitude Control by Momentum Exchange**

S. Asghar, A. Giffen, P. L. Palmer, R. M. Roberts

### **Continuous and Discrete Concepts for Detecting Transport Barriers in the Planar Circular Restricted Three Body Problem**

Michael Dellnitz, Robert Preis, Bianca Thiere, Kathrin Padberg

### **Low-Energy Transfers in the Earth--Moon System**

E. M. Alessi, G. Gómez, J. J. Masdemont

### **The Role of Invariant Manifolds in the Formation of Spiral Arms and Rings in Barred Galaxies**

M. Romero-Gómez, E. Athanassoula, J. J. Masdemont, C. Garcia-Gómez

### **Homoclinic Tangle Approach to Kicked Hydrogen**

Korana Bourke, K. A. Mitchell

**10h30-12h30**

**Room:** Sala de Actos

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### **MOGRAN-12: Symposium on Lie Group Analysis and Applications in Nonlinear Sciences (I)**

Organizer: Nail Ibragimov

Chair: Nail Ibragimov

## Technical Sessions

### Session Tu-SA/1

#### **Optimal System of Invariant Solutions for the Burgers Equation**

N. H. Ibragimov

#### **Group Classification Problem of the Wave Equations**

Salavat Khabirov

#### **Group-Invariant Solutions of Fractional Differential Equations**

R. K. Gazizov, A. A. Kasatkin, S. Yu. Lukashchuk

#### **Self-Adjointness and Quasi-Self- Adjointness of the Magma Equation**

Raisa Khamitova

#### **Differential Invariants of N-Dimensional Wave-Type Equations**

C. Tsaousi, C. Sophocleous

### 10h30-12h30

Room: Sala de Reuniões

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#### **SYMP-09: Symposium on Mathematical Modeling of Nonlinear Structures in Bose-Einstein Condensates (I)**

Organizers: Vladimir Konotop, Dmitry Pelinovsky

Chairs: Vladimir Konotop, Dmitry Pelinovsky

### Session Tu-SR/1

#### **Few Well Potentials in Optics and BEC: Variations on a Theme**

Panayotis Kevrekidis

#### **Stability of BEC Systems in Nonlinear Optical Lattices**

Lauro Tomio, Fatkhulla Abdullaev, Hedhio Da Luz, Arnaldo Gammal

#### **Discrete Breathers Collisions in Nonlinear Schrödinger and Klein--Gordon Lattices**

J. Cuevas, A. Álvarez, F. R. Romero, J. F. R. Archilla

#### **Stability of Nonlinear States of a Bose-Einstein Condensate**

D. A. Zezyulin, G. L. Alfimov, V. V. Konotop, V. M. Pérez-García

#### **Stability of Dark Solitons and Vortices in Harmonically Trapped Bose-Einstein Condensates**

Nick Proukakis, Nick Parker, Brian Jackson, Charles Adams, Carlo Barenghi

## Technical Sessions

**14h30-16h15**

**Room:** Auditório E

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### **Nonlinear Dynamics (I)**

Chair: Jiazhong Zhang

#### [Session Tu-AE/2](#)

##### **A Fuzzy Crisis in a Duffing-Van der Pol System**

Ling Hong, Jian-Qiao Sun

##### **Weight Functions Method in Stability Study of Non-Linear Systems**

Ion Stroe, Petrisor Parvu

##### **Extended Version of the Resonant Negative Feedback Chaos Control Method**

Elena Tamaseviciute, Arunas Tamasevicius, Gytis Mykolaitis, Tatjana Pyragiene, Skaidra Bumeliene

**14h30-16h15**

**Room:** Sala de Actos

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### **MOGRAN-12: Symposium on Lie Group Analysis and Applications in Nonlinear Sciences (II)**

Organizer: Nail Ibragimov

Chair: Nail Ibragimov

#### [Session Tu-SA/2](#)

##### **Type-II Hidden Symmetries for Some Nonlinear Partial Differential Equations**

M. L. Gandarias

##### **Nonclassical and Potential Symmetries for a Boussinesq Equation with Nonlinear Dispersion**

M. S. Bruzon, M. L. Gandarias

##### **Algebraic Aspects of Integrable Nonlinear Evolution Equations on Symmetric Spaces**

V. S. Gerdjikov

##### **Symmetry of SH(2) in Poincaré-Adronov-Hopf Bifurcation Problems with Potential Branching Equations**

I. V. Konopleva, B. V. Loginov, O. V. Makeev

## Technical Sessions

**14h30-16h15**

**Room:** Sala de Reuniões

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### **Chaos (I)**

**Chair:** Tom Solomon

#### [Session Tu-SR/2](#)

#### **Method of Complete Bifurcation Groups (MCBG) and Prediction of Rare Regular and Chaotic Attractors and Catastrophes**

M. V. Zakrzhevsky

#### **Control of Chaos and Global Bifurcation Analysis of Nonlinear Dynamical Systems Using NLO and SPRING Software**

M. V. Zakrzhevsky, I. T. Schukin, V.Yu. Yevstignejev, V.Yu. Frolov

#### **Rare Chaotic and Regular Attractors and Unknown Multiplicity in Typical Driven Oscillators**

V.Yu. Yevstignejev, M. V. Zakrzhevsky, I. T. Schukin, R. S. Smirnova, V.Yu. Frolov, E. P. Shilvan

#### **Periodic Orbits, Dynamical Traps and Chaos in Jets**

Michael Uleysky, Maxim Budyansky, Sergey Prants

**16h45-18h30**

**Room:** Auditório E

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### **Nonlinear Dynamics (II)**

**Chair:** Kevin Mitchell

#### [Session Tu-AE/3](#)

#### **Model Reduction of Nonlinear Continuous Dynamic Systems on Inertial Manifolds with Delay**

Jia-Zhong Zhang, Li-Ying Chen, Sheng Ren, Ling Hong

#### **Nonlinear Dynamics and Generalised Entropy of Curves**

Aldo Balestrino, Andrea Caiti, Emanuele Crisostomi

#### **Switched Synchronization of Chaotic Lorenz Oscillators**

Denis Efimov, Antonio Loría, Elena Panteley

## Technical Sessions

**16h45-18h30**

**Room:** Sala de Actos

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### **MOGRAN-12: Symposium on Lie Group Analysis and Applications in Nonlinear Sciences (III)**

Organizer: Nail Ibragimov

Chair: Nail Ibragimov

#### [Session Tu-SA/3](#)

##### **Approximate Partial Noether Operators and First Integrals for Coupled Nonlinear Oscillators**

I. Naeem, F. M. Mahomed

##### **Application of the Composite Variational Principle to Shallow Water Equations**

Emrullah Yaşar, Teoman Özer

##### **Physical Conserved Quantities for the Axisymmetric Liquid, Free and Wall Jets**

R. Naz, D. P. Mason, F. M. Mahomed

**16h45-18h30**

**Room:** Sala de Reuniões

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### **SYMP-02: Symposium on Computational Techniques for Engineering Sciences**

Organizers: Lino Figueiredo, Cecília Reis

Chairs: Lino Figueiredo, Cecília Reis

#### [Session Tu-SR/3](#)

##### **Algorithmic Music Composition: A Survey**

Isabel Ferreira, José Tenreiro Machado

##### **Evolutionary Perspectives in Computer Music**

Cecília Reis, Viriato M. Marques, José Tenreiro Machado

##### **An Evolutionary Approach to the Trajectory Planning of Redundant Robots**

Maria G. Marcos, J. A. Tenreiro Machado, T-P. Azevedo-Perdicoúlis

##### **Computational Intelligence Techniques in Engineering**

Viriato M. Marques, Cecília Reis, Luis Roseiro, J. A. Tenreiro Machado

## Technical Sessions

**Wednesday, July 30, 2008**

**10h30-12h30**

**Room:** Auditório E

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**SYMP-08: Symposium on Celestial Mechanics and Dynamical Astronomy:  
Methods and Applications (II)**

Organizers: Josep Masdemont, Marian Gidea

Chairs: Josep Masdemont, Marian Gidea

[Session We-AE/1](#)

**Gravitational Potential of a Massive Disk**

Antonio Elipe, Eva Tresaco, Andres Riaguas

**Periodic, Escape and Chaotic Orbits in Copenhagen and (n+1)-Body Ring Problems**

R. Barrio, F. Blesa, S. Serrano

**The Lunar Case of the Spatial Elliptic Restricted Three Body Problem**

Martin Lara, Jesus Palacian, Patricia Yanguas

**An Accounting Device for Biasymptotic Solutions: the Scattering Map in the  
Restricted Three Body Problem**

A. Delshams, J. J. Masdemont, P. Roldán

**Optimal Capture Trajectories using Multiple Gravity Assists**

S. D. Ross, Stefan Jerg, Oliver Junge

**10h30-12h30**

**Room:** Sala de Actos

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**MOGRAN-12: Symposium on Lie Group Analysis and Applications in  
Nonlinear Sciences (IV)**

Organizer: Nail Ibragimov

Chair: Nail Ibragimov

[Session We-SA/1](#)

**Conserved Forms of Second Order Differential Equations**

C. Muriel, J. L. Romero

## Technical Sessions

### **Lie Group Classification of Systems of Diffusion Equations**

E. Demetriou, C. Sophocleous, N. M. Ivanova

### **Analytical Investigation of a Two-Phase Modell describing a Three-Way-Catalytic Converter**

J. Volkmann, N. Migranov

### **Lie Infinitesimal Conserved Quantities for Itô Stochastic ODEs**

Ebrahim Fredericks, Fazal Mahomed

**10h30-12h30**

**Room:** Sala de Reuniões

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### **SYMP-09: Symposium on Mathematical Modeling of Nonlinear Structures in Bose-Einstein Condensates (II)**

Organizers: Vladimir Konotop, Dmitry Pelinovsky

Chairs: Vladimir Konotop, Dmitry Pelinovsky

### [Session We-SR/1](#)

### **Eigenvalues of Nonlinear Bound States in the Thomas-Fermi Approximation**

C. Gallo, Dmitry Pelinovsky

### **Bose-Einstein Condensates and Multi-Component NLS Models on Symmetric Spaces of BD.I -Type. Expansions over Squared Solutions**

V. S. Gerdjikov, D.J. Kaup, N. A. Kostov, T. I. Valchev

### **Fock-Space WKB Method for the Two-Mode Boson Josephson Model Describing BEC Trapped in a Double-Well Potential**

V. S. Shchesnovich, M. Trippenbach

### **Adiabatic Phases and Adiabatic Invariants in Coherent Manipulation of Matter-Waves**

Alexander Itin



## Technical Sessions

**14h00-15h00**

[Lobby Conference Rooms](#)

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### **Student's Poster Session**

**Image Processing for Determination of Drop Distribution in Liquid-Liquid Dispersion**

L. Brás, E. Gomes, M. Ribeiro

**On the Design of a Fail Stop Microcontroller**

H. Nogueira, José Santos

**Thursday, July 31, 2008**

**10h30-12h30**

**Room:** Sala de Actos

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### **Chaos (II)**

Chair: Mikhail Zakrzhevsky

[Session Th-SA/1](#)

**An Overview of the Behaviour of a Scattering Map for the Dynamics of two Interacting Particles in a Uniform Magnetic Field**

Diogo Pinheiro, Robert MacKay

**The Topology of Nested Tangles**

Kevin Mitchell

**Chaotic Mixing and Reaction Dynamics in a Chain of Vortices**

Lily Beauvilliers, Mollie Schwartz, Matthew Paoletti, Tom Solomon

**Atomic Motion in a Laser Field: between Chaos and Random Walking**

Victor Argonov, Sergey Prants

## Technical Sessions

**10h30-12h30**

**Room:** Sala de Reuniões

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### **Nonlinear Oscillations**

Chair: Jörg Volkmann

#### [Session Th-SR/1](#)

##### **Generalized Synchronization of Chaotic Systems with Minimum Control Effort in the Steady State**

Mohammad Saleh Tavazoei, Mohammad Haeri, Smaill Alibeaki

##### **Inductor-Free Version for Chua's Oscillator based in Electronic Analogy**

Guillherme Andrucio, Ronilson Rocha

##### **Robust Communication-Masking via a Synchronized Chaotic Lorenz Transmission System**

A. Loría, S. Poinsard

##### **Giant Acceleration in Hamiltonian Systems Under Weak AC Driving**

D. V. Makarov, M. Yu. Uleysky

**14h30-16h15**

**Room:** Sala de Actos

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### **SYMP-08: Symposium on Celestial Mechanics and Dynamical Astronomy: Methods and Applications (III)**

Organizers: Josep Masdemont, Marian Gidea

Chairs: Josep Masdemont, Marian Gidea

#### [Session Th-SA/2](#)

##### **A Multi-Mirror Solution for the Deflection of Dangerous Neos**

Massimiliano Vasile

##### **New Periodic Orbits in the Solar Sail Restricted Three Body Problem**

J. D. Biggs, C. McInnes, Thomas Waters

##### **Solar Sail Orbits at the Earth-Moon Libration Points**

Jules Simo, Colin R. McInnes

##### **Interplanetary Trajectory Preliminary Design Tool for the Laplace Mission**

Arnaud Boutonnet, Elisabet Canalias

## Technical Sessions

**14h30-16h15**

**Room:** Sala de Reuniões

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### **Nonlinear Hydrodynamics**

Chair: Maria Luz Gandarias

#### [Session Th-SR/2](#)

#### **A Boundary Layer Problem in Power Law Fluids through a Moving Flat Plate with Injection**

Chunqing Lu

#### **Image Processing for the Estimation of Drop Distribution in Agitated Liquid-Liquid Dispersion**

L. Brás, E. Gomes, M. Ribeiro

#### **Nonlinear Liquid Sloshing in Partially Filled Elliptic Tanks Carried by Tank Vehicles**

Liming Dai, Leo L. Xu

#### **Interplay of Ray and Wave Descriptions for Long-Range Sound Propagation in an Underwater Sound Channel**

D. V. Makarov, L. E. Kon'kov, E. V. Sosedko, M. Yu. Uleysky