6th Internacional Conference on Nonlinear Science and Complexity

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INPE - National Institute for Space Research
São José dos Campos - SP - Brazil

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16 - 20 May 2016

Sponsors:

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Organizers:

INPE · Ministério da Ciência, Tecnologia e Inovação · GOVERNO FEDERAL BRASIL PÁTRIA EDUCADORA

Forwards and Welcome Message

The *International Conference on Nonlinear Science and Complexity – NSC*, was created in 2006. In this same year, Beijing, in China, hosted its first edition. Since then, this conference takes place each year and have being considered as the main scientific scenario that 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 will focus on fundamental theories and principles, analytical and symbolic approaches, computational techniques in nonlinear science, nonlinear mathematics, and complexities.

At this edition, the following subjects will be particulary address: Analysis and Control of Nonlinear Dynamical Systems with Practical Applications; Bifurcation Analysis and Applications; Celestial Mechanics and Dynamical Astronomy; Chaos and Global Nonlinear Dynamics; Climate Dynamics; Complex Networks; Control in Complex Systems; Control of Chaos; Discontinuous Dynamical Systems; Discrete Dynamical Systems; Epidemiology and Mathematical Models; Fluidodynamics, Plasma and Turbulence; Geophysical Nonlinear Dynamics; Modeling, Numerical Simulation and Optimization; Nonlinear Dynamics and Complex Systems; Nonlinear Dynamics in Lasers; Nonlinear Dynamics in Thermal and Fluid Sciences; Nonlinear Dynamics of Systems with Infinite Dimension; Nonlinear Fractional Dynamics and Applications; Nonlinear Systems and Neural Dynamics; Stochastic Models; Synchronization in Nonlinear Systems; System Biology; Time Series Analysis.

We are very proud to organize the sixty edition of this so relevant international meeting in Sao Jose dos Campos, Brazil, at National Institute for Space Research - INPE. As so, on behalf of the Organizing Committee, we would like to welcome you in São José dos Campos, Brazil, for the *"6th International Conference on Nonlinear Science and Complexity – NSC-2016*". Also, we would like to express our profound gratitude for your keen interest and very enthusiastic support shown for this conference.

We would also like to thank everybody who joints us in the organization of this conference. It includes all the sponsors for their technical and financial support; all the participants for their contributions; all the committee members for their work and follow-through. We also expect that you have the opportunity to make friends, exchange scientific knowledge and establish collaborations that allow meaning contributions to the field of nonlinear science and complexity.

For the Organizing Committee,

Elbert E. N. Macau Mark Edelman Miguel A. F. Sanjuan

Conference Organizing Committee

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Acknowledgment

The organizers would like to thanks Prof. Jason Gallas, whom provides the Figure that was used to create the NSC-2016 logo. This Figure, in Prof. Gallas words, is "a stability diagram of a model of prey-predator system including the dormancy of predators, a model aiming to elucidate the paradox of enrichment in the context of ecosystems."

Conference Information

Registration

Registration for the conference Will be open at the following times, in the LIT / Fernando de Mendonça Auditory atrium:

Monday, May 16th	8:00 AM – 5:00 PM
Tuesday, May 17th	8:00 AM – 2:00 PM
Wednesday, May 18th	8:00 AM – 2:00 PM
Thursday, May 19th	8:00 AM – 2:00 PM
Frieday, May 30th	8:00 AM – 11:00 AM

Internet

Wireless internet access is available in the LIT building. The network available is *LIT_VISITANTES* which password is *Jf37DmcNNQ*.

Lunch breaks

The lunch will be served in the INPE's restaurant (see map), all days, from 12:15 PM to 13:30 PM. It will cost about 29.00 BRL per kilo. Alternatively, there is also a cafeteria, which besides lunch also offers coffee, drinks and snacks during all day.

Poster Sessions – Tuesday and Thursday, May 17, 19, 1:30 PM – 3:30 PM

Banquet – Wednesday, May 18, 7:00 PM – 10:00 PM

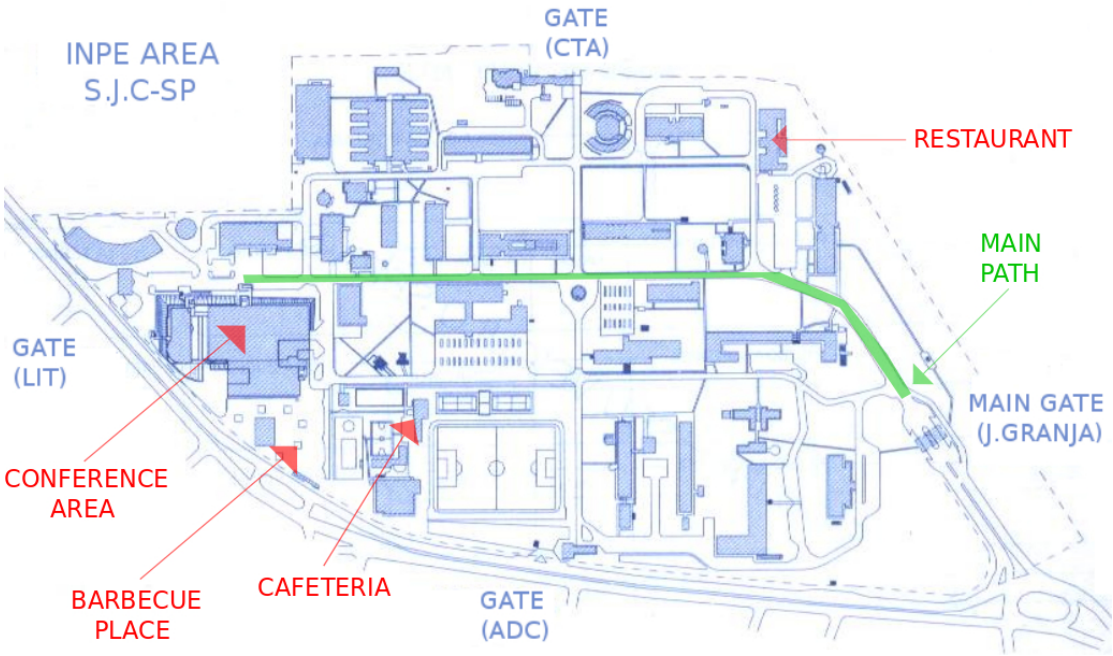
The banquet will take place at INPE's recreation area (see map), nearby LIT. There will be a buffet with salads and vegetables. The main disch will be the Brazilian barbecue served in an all-you-can-eat basis. The following drinks are included (up 4 to each person): water, soft drinks, juices and beer, and caipirinha (up to 3 for person).
The banquet is included in the full registration fee. Additional tickets (for accompanying persons or for the ones who did nor pay full registration fee) can be purchased at the registration desk.

Coffee-Breaks

All coffee-breaks will be served in in the LIT / Fernando de Mendonça Auditory atrium.

How to get INPE from Sao Paulo and Rio de Janeiro

INPE Campus


INPE AREA
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(LIT)
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(J.GRANJA)
CONFERENCE
AREA
BARBECUE
PLACE
CAFETERIA
GATE
(ADC)

Zaslavsky Award Speech

Systems with power-law memory and fractional dynamics
– ***Mark Edelman***
Stern College at Yeshiva University, New York, USA;
Monday, May 16th, 2016
FM auditorium -Second Floor

Dr. Mark Edelman received his PhD in Astrophysics from the Odessa State University, former USSR. For a long time he worked as a Research Scientist and a Senior Research Scientist at the Rostov State University and Rostov Pedagogical Institute, Rostov-on-Don, USSR. From 1993 to 2010 he worked at the Courant Institute of Mathematical Sciences, New York University, New York City, USA, as a research scientist. His broad scientific interests include cosmic gas dynamics, corrugation instability of shock waves, nonlinear dynamics, chaos theory, fractional calculus. His present scientific activity is concentrated on the fractional dynamical systems and systems with power-law memory. He is a member of the editorial boards of "Journal of Applied Nonlinear Dynamics" and "Fractional Calculus and Applied Analysis". His recent publications include three book chapters and numerous journal articles. He was Invited Speaker at numerous international conferences He has received the American Astronomical Society Grant awarded for the inves tigation of the stability of oblique MHD shock waves. Since 2009 Dr. Edelman has been teaching various physics courses and supervising student's research at Stern College for Women, Yeshiva University, simultaneously continuing his research at the Courant Institute.

Abstract: Systems with power-law memory are common in natural and social sciences and engineering. The most appealing is appearance of power-law memory in biological applications. A consistent consideration of discrete systems with power-law memory can be done through the use of fractional Eulerian numbers. It can be shown that systems with power-law memory can be described by fractional difference/differential equations.
Due to the integro-differential nature of fractional derivatives, investigation of general properties of fractional differential equation is very difficult. To investigate general properties of fractional dynamics we consider fractional maps, which can be derived from fractional differential equations with periodic kicks or, in the case of essentially discrete systems, from fractional difference equations. Using the fractional standard map (harmonic nonlinearity) and the fractional logistic map (quadratic nonlinearity) as examples we show that nonlinear systems with power-law memory demonstrate a new type of attractors - cascade of bifurcation type attractors, power-law convergence/divergence of trajectories, bifurcations with changes in the memory parameter, intersection of trajectories, and overlapping of attractors.

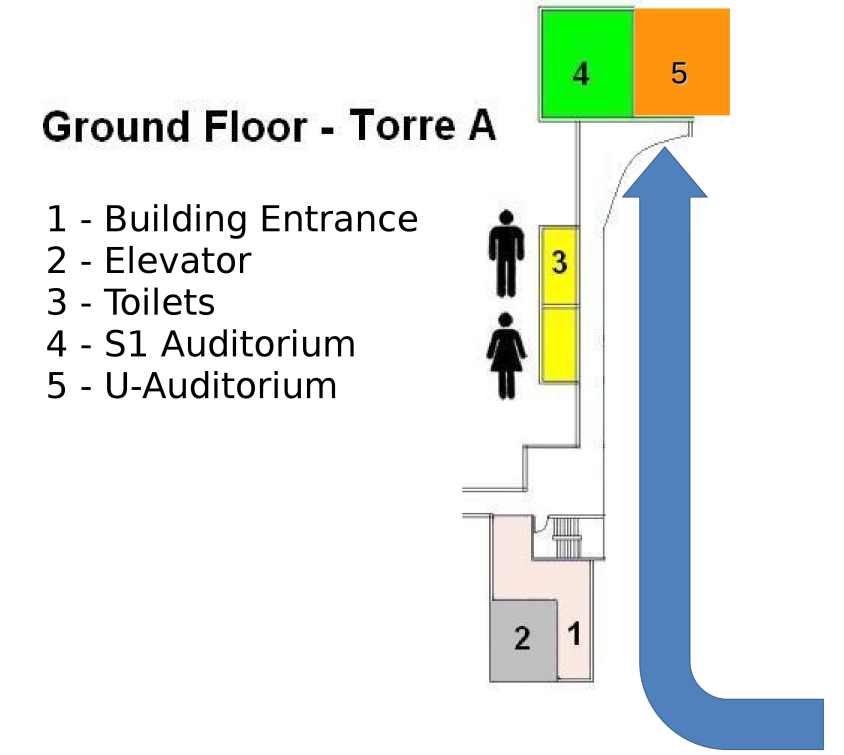
Lagrange Award Speaker

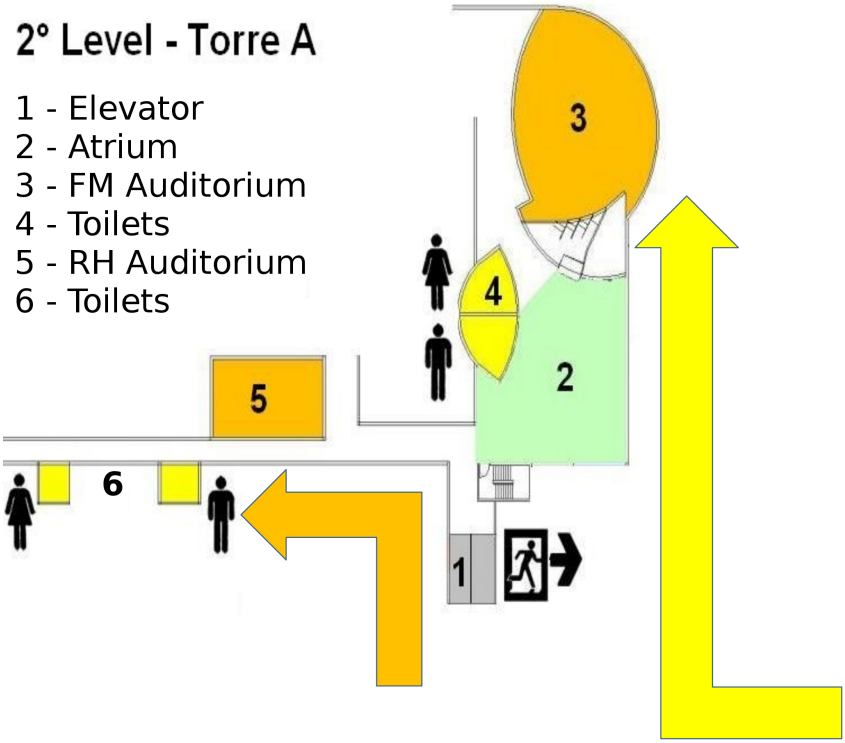
Hopf bifurcation and chaos in a third-order phase-locked loop
– *José Roberto Castilho Piqueira*
Escola Politécnica da Universidade de São Paulo, São Paulo-SP, Brazil;
Tuesday, May 17th, 2016
FM auditorium -Second Floor

Dr. José Roberto Castilho Piqueira was born in Sorocaba, SP, Brazil, in 1952. He received the B.S., M.S., and Ph.D. degrees in electrical engineering from Universidade de São Paulo in 1974, 1983, and 1987, respectively. From 1974 to 1994, he worked in several telecommunication projects for Brazilian electronic and service industries, designing and developing circuits, equipments, and systems. Since 1994, he has been dedicated to teaching and research at Escola Politécnica da Universidade de São Paulo, and participating in projects for Brazilian Oil Agency and Brazilian Navy. Currently, he is a Full Professor and Dean of São Paulo Engineering School, working with time distribution networks and running a laboratory where analytical and numerical studies support electronic and optical experiments, considering the several possible topologies and quantum control models. Besides, as synchronous complex networks appear in many aspects of human life, he works with some biological models by using differential equations and proposing complexity measures for some spreading phenomena. Considering his areas of interest, he published a hundred of complete papers in international periodicals and congress proceedings, indexed in the Web of Science.

Abstract: Phase-locked loops (PLLs) are devices able to recover time signals in several engineering applications. The literature regarding their dynamical behavior is vast, specifically considering that the process of synchronization between the input signal, coming from a remote source, and the PLL local oscillation is robust. For high-frequency applications it is usual to increase the PLL order by increasing the order of the internal filter, for guarantying good transient responses; however local parameter variations imply structural instability, thus provoking a Hopf bifurcation and a route to chaos for the phase error. Here, one usual architecture for a third-order PLL is studied and a range of permitted parameters is derived, providing a rule of thumb for designers. Out of this range, a Hopf bifurcation appears and, by increasing parameters, the periodic solution originated by the Hopf bifurcation degenerates into a chaotic attractor, therefore, preventing synchronization.

LIT Conference Center





Technical Sessions at Glance

Time	Monday	Tuesday	Wednesdays	Thursday	Friday
8:00 – 8:30	Registration	Registration	Registration	Registration	Registration
8:30 – 09:00	Open Ceremony	MS-3b / MS-4b / TS-04	MS-6a / TS-07 / TS-08/ MS-8	MS-7a / MS 6b / TS-5	MS-7b / TS-12 / TS -13
9:00 – 10:30	MS-1a / MS-2a / TS-01				
10:30 – 10:45	Coffee-Break	Coffee-Break	Coffee-Break	Coffee-Break	Coffee-Break
10:45 – 11:30	P1	P4	P7	P9	P13
11:30-12:15	P2	P5	P8	P10	P14
12:15-13:30	Lunch	Lunch	Lunch	Lunch	Lunch
13:30 – 15:30	MS-1b / MS-2b / TS-02	Poster-1	Practical activities	Poster-2	TS-14 / TS-15 /TS-16
15:30 – 15:45	Coffee-Break	Coffee-Break	Coffee-Break	Coffee-Break	Coffee-Break
15:45 – 16:30	P3	P6	Practical activities	P11 / P12	P15
16:30 – 18:30	MS-3a / MS-4a / TS-03	MS-3c / MS-5 / TS-06	Discussions	TS-9 / TS-10/ TS-11	P16 , Poster Award & Closing ceremony

Plenaries

- P-01 – ***Jason Gallas***, Universidade Federal da Paraíba-PB, Brazil;
  Periodicity and chaos:
  How are they organized in lasers, circuits, biochemical oscillators and other complex flows?
- P-02 – **Christian Bick**, University of Exeter, Exeter, United Kingdom;
  Dynamics of Phase Oscillators with Generalized Coupling
- P-03 – ***Mark Edelman***, Stern College at Yeshiva University, New York, USA.
  Systems with power-law memory and fractional dynamics
- P-04 – ***Miguel Sanjuán***, King Juan Carlos University, Mósteles, Madrid, Spain.
  Basin Entropy: A new tool to explore uncertainty in dynamical systems
- P-05 - ***Lev A. Ostrovsky***, National Oceanic and Atmospheric Administration (NOA), Boulder, CO, USA;
  Acoustic radiation force, dynamics of particles and bubbles in acoustic field, and biomedical applications.
- P-06 – ***José Roberto Castilho Piqueira***, Escola Politécnica, USP, Brazil;
  Hopf bifurcation and chaos in a third-order phase-locked loop
- P-07 – ***Martin Mönnigman***, Ruhr-Universität Bochum, Germany;
  Constructive Nonlinear Dynamics: Integrating Applied Bifurcation Theory with Optimization.
- P-08 – ***Lea F. Santos***, Yeshiva University, New York, USA;
  Powerlaw Decays and Thermalization in Chaotic Quantum Systems.
- P-09 – ***Luis Fernando Costa Alberto***, USP de São Carlos, Brazil;
  Avoiding Blackouts with Theory of Stability Regions.
- P-10 – ***J. A. Tenreiro Machado***, Politécnica do Porto, Porto, Portugal;
  Fractional calculus and applications.
- P-11 – ***J. M. Martínez***, IMECC, UNICAMP, Brazil;
  Complexity in Unconstrained and Constrained Optimization.
- P-12 – **Matteo Tanzi**, Imperial College, London, UK;
  Expanding Dynamics on Heterogeneous Networks: Mean Field Reduction and Synchronisation.

  P-13 – ***Mike Field***, Imperial College London, London, United Kingdom and Rice University, Houston, USA;
  A Modularization of dynamics theorem for asynchronous networks.
- P-14 – ***Albert C. J. Luo***, Southern Illinois University, USA;
  Complete route of period-1 motions to chaos in a time-delayed Duffing oscillator.
- P-15 – **Thomas Kapitaniak**, Technical University of Lodz, Poland
  Synchronization of pendula: From Huygens to chimeras
- P-16 – ***Gonzalo M. Ramirez-Ávila***, Universidad Mayor de San Andrés, La Paz, Bolivia;
  Arithmetic progression of spiking and bursting in Rulkov's Model

Symposia

MS-1: TRANSIENT CHAOS IN COMPLEX SYSTEMS

Abraham Chian[1], Erico Rempel[2] , and Miguel Sanjuán[3]

[1]ITA, INPE & University of Adelaide, São Jose dos Campos & Adelaide, Brazil & Australia, abraham.chian@gmail.com
[2]ITA & INPE, São Jose dos Campos, Brazil, erico_rempel@yahoo.com.br
[3]Universidad Rey Juan Carlos, Madrid, Spain, miguel.sanjuan@urjc.es

Description: Transient chaos refers to chaotic phenomena that appear in a finite lifetime. In contrast to permanent chaos associated with the asymptotic state, transient chaos are associated with a nonequilibrium state that has different behavior from the asymptotic behavior of a system. Examples of complex phenomena and dynamical structures related to transient chaos are: chaotic saddles, chaotic leaking systems, crises, on-off intermittency, edge of chaos, chaotic advection, fractal basin boundaries, transport barriers, and turbulence. This mini-symposium aims to discuss the concepts and applications of transient chaos in astrophysics, biology, fluids, and plasmas.

MS-2: Chaos, scaling laws and dynamical systems

André Luís Prando Livorati[1]

[1]Departamento de Física – UNESP Rio Claro -SP, Brazil, livorati@rc.unesp.br

Description : The aim of this minisymposium is to drawn an overview for dynamical systems that can be described by scaling laws arguments and also interpret some of the phenomena that the non-linearity can bring to their dynamics. Very often these systems may present chaotic behavior in both dissipative and non-dissipative dynamics. In the non- dissipative case, a mixed phase space, with invariant tori, KAM islands and chaotic seas if often observed. Depending of the combination of control parameters and initial conditions, some variables of these systems can be described by scaling laws and classes of universality can be obtained. In the dissipative dynamics, chaotic attractors can lead the dynamics to different scenarios, where transients and assymptotic behavior of some variables can also be setup by scaling arguments. Also, self-similarity structures in the parameter space can be obtained and characterized by means of uncertainty exponents, and anomalous transport can be obrserved in different billiard systems.

MS-3: Dynamics and synchronization in complex networks

Rafael Soares Pinto[1], Tiago Pereira[2]

[1]Universidade de São Paulo, São Carlos, Brazil, rsoaresp@gmail.com
[2]Universidade de São Paulo, São Carlos, Brazil, tiago@icmc.usp.br

Description : Complex behavior seen in nature arises from the coupling of many small and simple subsystems. To describe the topology of interactions, the machinery of complex network theory is often employed. The main purpose of this minisymposium is to bring together different people working on different dynamics, with special attention to synchronization phenomena, on complex networks, such that perspectives and experiences can be shared among the participants.

MS-4: Chaos-based communications and signal processing

Marcio Eisencraft[1]

[1]Escola Politécnica, University of São Paulo, São Paulo, Brazil, marcio@lcs.poli.usp.br

Description: In the last decades many possible applications of nonlinear dynamics in communication systems and signal processing have been reported. Conversely, techniques usually employed by the signal processing and communication systems community, as correlation, power spectral density analysis and linear filters, have been used to characterize chaotic dynamical systems. This minisymposium will present works that aim to use tools from both fields to generate new and interesting results.

MS-5: Computational Neuroscience

Leandro Alexandre da Silva[1] and Rafael Dias Vilela[1]

[1]Universidade Federal do ABC, Santo Andre, Brazil, {leandro.silva; rafael.vilela}@ufabc.edu.br

Description : Computational Neuroscience combines techniques from nonlinear and stochastic dynamics, information theory and other theoretical fields to offer both predictions to new phenomena and unifying, principle-unveiling explanations for known experimental results. This mini-symposium will address both individual and collective properties of neuronal dynamics.

MS-6: COMPLEX NETWORKS AS AN INTERDISCIPLINARY TOOL ON MEASUREMENT OF CRITICAL INFRASTRUCTURE'S VULNERABILITY AGAINST NATURAL DISASTERS

Leonardo B. L. Santos[1]

[1]Brazilian National Center for Monitoring and Early Warning of Natural Disasters (Cemaden/MCTI), São José dos Campos/SP, Brasil, santoslbl@gmail.com

Abstract: Natural disasters cause great human and material losses worldwide and its growing risk is a matter of global concern, especially with the prospects of increased frequency and intensity of extreme precipitation events. Structures such networks, with complex connections and interdependencies, permeate the research on Natural Disasters, from hydrography systems (threats) to critical infrastructure networks (impacts). Nonlinear Science and Complexity applications on natural disaster's researches are scientifically and socially relevant (http://oglobo.globo.com/sociedade/ciencia/a-matematica-na-prevencao-de-desastres-naturais-16981638).

MS-7: NONLINEAR DYNAMICS OF CONSERVATIVE AND DISSIPATIVE COMPLEX SYSTEMS

Organizer: Ricardo Luiz Viana[1]

[1] Departamento de Física, Universidade Federal do Paraná, Curitiba, PR, Brazil, viana@fisica.ufpr.br

Description : The main purpose of this minisymposium is to present recent developments in the nonlinear dynamics of conservative and dissipative complex systems, emphasizing applications in various fields like plasma physics, complex networks, turbulence and diffusion.

MS-8: Lie group analysis and its applications

Organizers: Maria Luz Gandarias[1], Maria Santos Bruzón[1] , Chaudry Masood Khalique[2]

[1] *Department of Mathematics, University of Cadiz, Puerto Real, Spain* , marialuz.gandarias@uca.es
[1] *Department of Mathematics, University of Cadiz, Puerto Real, Spain,* m.bruzon@uca.es
[2]*International Institute for Symmetry Analysis and Mathematical Modelling, Department of Mathematical Sciences, North-West University, Mafikeng Campus, Mmabatho, South Africa* Masood.Khalique@nwu.ac.za

Description : Several mathematical models that describe many phenomena in natural sciences, such as physics, biology, engineering, and economics can be modelled by nonlinear differential equations. However, it is difficult to obtain exact solutions of such nonlinear differential equations.

The Lie group analysis approach is considered to be a milestone in the search for solutions of nonlinear differential equations. In fact, although this approach is not always able to characterize the whole set of solutions, it allows one to get wide classes of exact solutions in a methodological way. Moreover the knowledge of symmetries admitted by an equation does not bring only to a reduction of independent variable but allows us to get conservation laws or to first integrals.

In the last few decades, a large amount of publications in theoretical and applied mathematics are devoted to the Lie group analysis methods and their applications.

The Lie group method specifies and extends the concept of symmetry, yields the effective methods of symmetry applications in complicated situations, gives correct statement of problems and in many cases indicates the possible way of their solutions.

The aim of this minisymposium is to focus the attention of scientists on symmetry methods to search for exact solutions of nonlinear models in physics, in engineering science, and in biology as well as to show recent developments of the theoretical tools of the Lie group methods applicable to the study of differential equations.

Contributive Technical Sessions

- TS-01 Nonlinear Dynamical Systems and Application - I
- TS-02 Celestial Mechanics and Dynamical Astronomy
- TS-03 Chaos and Global Phenomena - I
- TS-04 Chaos and Global Phenomena - II
- TS-05 Infinite Dimension Sytems, Pasma and Turbulence - I
- TS-06 Control in Chaos and Complex Systems
- TS-07 Biffurcation Theory and Applications - I
- TS-08 Synchronization and Complex Networks - I
- TS-09 Synchronization and Complex Networks - II
- TS-10 Nonlinear Dynamical Systems and Application - II
- TS-11 Modeling, Numerical Simulation and Optimization - I
- TS-12 Biffurcation Theory and Applications - II
- TS-13 Synchronization and Complex Networks - III
- TS-14 Modeling, Numerical Simulation and Optimization - II
- TS-15 Nonlinear Dynamical Systems and Application - III
- TS-16 Infinite Dimension Systems , Pasma and Turbulence - II

Program

May, 16th 2016 – Monday

8h00-8h30 – Registration

8h30-9h00 – Open Ceremony

9h00-10h30 – Parallel Sessions: Minisymposia and Contributive Sessions

MS-01 – Transient Chaos in Complex Systems I/II

Room: FM

Organizers: *Abraham Chian*, ITA, INPE & University of Adelaide, São Jose dos Campos & Adelaide, Brazil & Australia*; Erico Rempel*, ITA & INPE, São Jose dos Campos, Brazil; *and Miguel Sanjuán*, Universidad Rey Juan Carlos, Madrid, Spain.

- 9h00-9h30: **Boundary crisis and chaotic transient in a model of tumor growth**; *Miguel Sanjuán,* Universidad Rey Juan Carlos, Madrid, Spain.
- 10h00-10h30: **Transport Barriers In Bidimensional And Multidimensional Systems**; *Caroline Martins,* ITA, São Jose dos Campos, Brazil; *Marisa Roberto*, ITA, São Jose dos Campos, Brazil; *Iberê Caldas*, USP, São Paulo, Brazil.

MS-02 – Chaos, Scalling Laws and Dynamical Systems – I/II

Room: RH

Organizer: *André Luis Prando Livorati*, Departamento de Física – UNESP Rio Claro-SP, Brazil.

- 9h00-9h30: **A dynamical phase transition for a family of Hamiltonian mappings: a phenomenological investigation to obtain the critical exponents**; *Edson Denis Leonel*, Departamento de Física – UNESP Rio Claro -SP, Brazil;
- 9h30-10h00: **Chaotic dynamics in an elliptical billiard with soft walls**; *Tiago Kroetz*, Universidade Tecnológica Federal do Paraná, Pato Branco-PR, Brazil;
- 10h00-10h30: **Stickiness influence in a driven stadium-like billiard: An ensemble separation mechanism;** *André Luis Prando Livorati,* Departamento de Física- UNESP, Rio Claro-SP, Brazil.

TS-01 – Nonlinear Dynamical Systems and Application – I

Room: S1

Chair: *Thiago Prado*, INPE, Sao Jose dos Campos, Brazil

- 9h20-9h40: TS-01-2 - **Variational iteration method in the time fractional Burgers equation;** *Adrian R. Gómez*, Military University New Granada, Colombia; *Edmundo Capelas de Oliveira*, UNICAMP, Brazil.
- 9h40-10h00: TS-01-3 – **Nonlinear Dynamics of an Origami Structure Coupled to Smart Materials**; *Larissa Fonseca,* Federal University of Rio de Janeiro, Brazil; *Guilherme Vieira*, UFRJ, Brazil; *Marcelo Savi*, UFRJ, Brazil; *Alberto Paiva*, UFF, Brazil.
- 10h00-10h20: TS-01-4 -**The postgraduate Brazilian studies in Physics Teaching using Complex Network**; *Jefferson Nascimento,* SENAI CIMATEC, Brazil; *Camila de Sousa Pereira Guizzo*, SENAI CIMATEC, Brazil; *Roberto Monteiro*, FIB, Brazil; *Davidson Moreira*, UFES, Brazil; *Marcelo Moret*, SENAI CIMATEC, Brazil; *Hernane Pereira*, SENAI CIMATEC, Brazil

10h30-10h45 – Coffee-Break

10h45-12:15 – Plenary Talks

Room: FM

- 10h45-11h30: P-01 – ***Jason Gallas***, Universidade Federal da Paraíba-PB, Brazil;
  Periodicity and chaos: How are they organized in lasers, circuits, biochemical oscillators and other complex flows?
- 11h30-12h15: P-02 – **Christian Bick**, University of Exeter, Exeter, United Kingdom;
  Dynamics of Phase Oscillators with Generalized Coupling

12h15-13h30 – Lunch

13h30-15h30 – Parallel Sessions: Minisymposia and Contributive Sessions

MS-01 – Transient Chaos in Complex Systems II/II

Room: FM

Organizers: *Abraham Chian*, ITA, INPE & University of Adelaide, São Jose dos Campos & Adelaide, Brazil & Australia*; Erico Rempel*, ITA & INPE, São Jose dos Campos, Brazil; *and Miguel Sanjuán*, Universidad Rey Juan Carlos, Madrid, Spain.

- 13h30-14h00: **Route to hyperchaos and intermittency in Rayleigh-Bernard Convection**; *E.V. Chimanski,* ITA, São Jose dos Campos, Brazil; *R. Chertovskih*, ITA, São José dos Campos, Brazil; *Erico Rempel*, ITA & INPE, São Jose dos Campos, Brazil.

- 14h00-14h30: **Edge of chaos and genesis of turbulence**; *Abraham Chian,* ITA, INPE & University of Adelaide, São Jose dos Campos & Adelaide, Brazil & Australia; *Pablo Munoz,* Universidad de La Serena, La Serena, Chile; *Erico Rempel*, ITA & INPE, São José dos Campos, Brazil.
- 14h30-15h00: **Supertransient and amplitude-phase synchronization in astrophysical shear flows**; *Erico Rempel,* ITA & INPE, São Jose dos Campos, Brazil; *Rodrigo Miranda,* Faculdade Gama, Universidade de Brasilia (UnB), Brasilia, Brazil; *Abraham Chian*, ITA, INPE & University of Adelaide, São Jose dos Campos & Adelaide, Brazil & Australia;

MS-02 – Chaos, Scalling Laws and Dynamical Systems – II/II

Room: S1

Organizer: *André Luis Prando Livorati*, Departamento de Física – UNESP Rio Claro -SP, Brazil.

- 13h30-14h00: **Sensitive Dependence on Parameters of Continuous-time Nonlinear Dynamical Systems**; *Everton Medeiros*, Instituto de Física – USP, São Paulo-SP, Brazil; *Iberê Luis Caldas*, Instituto de Física – USP, São Paulo-SP, Brazil; *Murilo S. Baptista*, University of Aberdeen, ICSMB, Aberdeen, Scotland.
- 14h00-14h30: **Scaling laws and critical exponents in discrete mappings**; *Juliano Antônio de Oliveira*, Universidade Estadual Paulista-UNESP, São João da Boa Vista-SP, Brazil.
- 14h30-15h00: **Chaotic Explosions;** *Eduardo G. Altmann*, Max Planck Institute of Physics of Complex Systems, Dresden, Germany; *Jefferson Stafusa Elias Portela*, Universidade Tecnológica Federal do Paraná, Pato Branco-PR, Brazil; *Tamás Tél*, Eötvös Loránd University, Budapest, Hungary

TS-02 – Celestial Mechanics and Dynamical Astronomy

Room: RH

Chair: Othon Winter, UNESP, Guaratinguetá, Brazil

- 13h30-13h50: TS-02-1 - **The influences of the companion for the formation of the Gamma-Cephei planetary system;** *Ricardo Moraes*, UNESP, Brazil; *Ernesto Vieira Neto*, UNESP, Brazil.
- 13h50-14h10: TS-02-2 - **A Firefly Planetary Ring**; *Othon Winter*, UNESP, Brazil; *Alexandre Souza*, UNESP, Brazil; *Rafael Sfair*, UNESP, Brazil; *Silvia Giuliatti Winter*, UNESP, Brazil; *Decio Mourão*, UNESP, Brazil; *Dietmar Foryta*, UFPR, Brazil.
- 14h10-14h30: TS-02-3 – **Different population of hypothetical objects in the Pluto system and the New Horizons mission**, *Silvia M. Giuliatti Winter*, UNESP, Brazil.
- 14h30-14h50: TS-02-4 – **On the oldest asteroid families in the main belt**; *Valerio Carruba*, UNESP, Brazil; *David Nesvorný*, Southwest Research Institute, USA; *Safwan Aljbaae*, UNESP, Brazil; *Rita Domingos*, UNESP, Brazil; *Mariela Huaman*, UNESP, Brazil.
- 14h50-15h10: TS-02-5 – **On the Karin family**; *Valerio Carruba*, UNESP, Brazil; *David Nesvorný*, Southwest Research Institute, USA.

- 15h10-15h30: TS-02-6 – **Lags of Prometheus and Pandora**; *Thamiris de Santana*, UNESP, Brazil; *Othon Winter*, UNESP, Brazil; *Decio Mourão*, UNESP. Brazil;

15h30-15h45 – Coffee-Break

15h45-16:30 – Plenary Talks

Room: FM

- 15h45-16h30: P-03 – ***Mark Edelman***, Stern College at Yeshiva University, New York, USA;
  Systems with power-law memory and fractional dynamics

16h30-18h30 – Parallel Sessions: Minisymposia and Contributive Sessions

MS-03 – Dynamics and synchronization in complex networks I/III

Room: FM

Organizers: *Rafael Soares Pinto*, USP, São Carlos, Brazil *and Tiago Pereira*, USP, São Carlos, Brazil.

- 16h30-17h00: **Synchrony patterns on gradient networks**; *Miriam Manoel*, Departamento de Física, ICMC – USP São Carlos-SP, Brazil; *M. Roberts*, Department of Mathematics, University of Surrey, Guildford, United Kingdom;
- 17h00-17h30: **Robust heteroclinic networks in coupled identical cell networks: Realization and patterns of synchronization**; *Mike J Field*, Department of Mathematics – Imperial College, London, United Kingdom & Rice University, Houston-TX, USA;
- 17h30-18h00: **Effects of synaptic plasticity on the synchronisation in neural network;** P. R. Protachevicz*, R. C. Bonetti, F. S. Borges, R. R. Borges, K. C. Iarosz, A. M. Batista*, Universidade Estadual de Ponta Grossa - Setor de Ciências Exatas, Ponta Grossa – PR, Brazil.
- 18h00-18h30: **Squared sine logistic map**; *R. Egydio de Carvalho*, UNESP, Rio Claro-SP, Brazil; *Edson D. Leonel*, Departamento de Física - UNESP, Rio Claro-SP, Brazil;

MS-04 – Chaos-based communications and signal processing – I/II

Room: RH

Organizer: *Marcio Eisencraft*, Escola Politécnica - USP, São Paulo-SP, Brazil

- 16h30-17h00: **Chaotic Map Sequence as Fingerprint for Physical Authentication System**; *Joao V. C. Evangelista*, *Daniel Chaves, Cecilio Pimentel,* Universidade Federal de Pernambuco, Recife, Brazil;

- 17h00-17h30: **Spectral Properties of the Orbits of the Hénon map**; *Rafael Costa* & *Marcio Eisencraft,* Escola Politécnica, University of São Paulo, São Paulo, Brazil;
- 17h30-18h00: **White Gaussian Chaos;** *Marcio Eisencraft*, Escola Politécnica - USP, São Paulo-SP, Brazil.

TS-03 – Chaos and Global Phenomena – I

Room: S1
Chair: *Antônio Marcos Batista*, Universidade Estatudal de Ponta Grossa, Brazil

- 16h30-16h50: TS-03-1 - **Complexity Metric Applied to the Discrete Events Systems**; *João Paiva*, UFG, Brazil; Viviane Gomes, IFG, Brazil; *Bruno Aniceto*, UFG, Brazil; *Geovanne Furrie*l, UFG, Brazil; *Lais Fernanda*, UFG, Brazil; *Wesley Calixto*, UFG, Brazil.
- 16h50-17h10: TS-03-2 - **First return times to approximated generating partitions of induced Duffing map**; *Rodrigo Pereira*, UTFPR, Brazil.
- 17h10-17h30: TS-03-3 – **Numerical Imprecision and its Impact on Discrete Systems as Logistic Map**; *Bruno Ossalin Paiva,* Universidade Federal de São João del Rei, Brazil; *Erivelton Geraldo Nepomuceno*, UFSJ, Brazil; *Gleison Amaral*, UFSJ, Brazil.
- 17h30-17h50: TS-03-4 – **Anomalous sea surface structures (rogue waves) as an object of statistical topography**; *Valeriy Klyatskin*, Obukhov Atmospheric Physics Institute of RAS, Russia; *Konstantin Koshel*, Pacific Oceanological Institute, Russia.
- 17h50-18h10: TS-03-5 – **Effect of the turbulent diffusion on passive scalar transport induced by an isolated vortex model**; *Konstantin Koshel*, Pacific Oceanological Institute, Russia; *Eugeny Ryzhov*, Pacific Oceanological Institute, Russia; *Vladimir Zhmur*, Institute of Oceanology of RAS, Russia.
- 18h10-18h30: TS-03-6 – **Nonlinear free vibrations of shear deformable beams with axially movable boundary conditions**; *Francesco Clementi*, Polytechnic University of Marche, Italy; *Stefano Lenci*, Polytechnic University of Marche, Italy; *Giuseppe Rega*, Sapienza University of Rome, Italy.

May, 17th 2016 – Tuesday

8h30-10h30 – Parallel Sessions: Minisymposia and Contributive Sessions

MS-03 – Dynamics and synchronization in complex networks II/III

Room: FM
Organizers: *Rafael Soares Pinto*, USP, São Carlos, Brazil *and Tiago Pereira*, USP, São Carlos, Brazil

- 8h30-9h00: **Synchronization and Applications**; *Hildebrando M. Rodrigues*, Departamento de Matemática Aplicada e Estatística, ICMC-USP, São Carlos-SP, Brazil;
- 9h00-9h30: **Connectivity-Driven Coherence in Complex Networks;** *Deniz Eroglu*, *Tiago Pereira*, Institute of Mathematical and Computer Sciences, USP, São Carlos, Brazil.
- 9h30-10h00: **Using neuroimaging techniques to reveal the brain complex networks at rest**; *R.C. Mesquita*, S.L. Novi, Instituto de Física, UNICAMP, Campinas-SP, Brazil; R.F. Casseb, Faculdade de Ciências Médicas, UNICAMP, Campinas-SP, Brazil; G. Castellano, Instituto de Física, UNICAMP, Campinas-SP, Brazil;
- 10h00-10h30: **Collective dynamics in two populations of noisy oscillators with asymmetric interactions**; *Thomas Kauê Dal'Maso* Peron, ICMC-USP, São Carlos-SP, Brazil; Francisco *Rodrigues*, ICMC-USP, São Carlos-SP, Brazil;

MS-04 – Chaos-based communications and signal processing – II/II

Room: RH
Organizer: *Marcio Eisencraft*, Escola Politécnica - USP, São Paulo-SP, Brazil

- 8h30-9h00: **Chaotic Properties of the Hénon Map with a linear filter**; *Rodrigo T. Fontes* & *Marcio Eisencraft,* Escola Politécnica - USP, São Paulo-SP, Brazil;
- 9h00-09h30: **IIR Equalization Based on Complexity Measures in the Context of Chaotic Information Sources**; *Patrick F. Coutinho, DCA/FEEC/UNICAMP, Campinas, Brazil, Diogo C. Soriano,* CECS/UFABC, Santo André, Brazil, *Filipe Ieda Fazanaro,* CECS/UFABC, Santo André, Brazil, *Romis Attux,* DCA/FEEC/UNICAMP, Campinas, Brazil*;*
- 09h30-10h00: **A Switching Scheme Between Conventional and Chaos-based Communication Systems;** *Renato Candido*, *Magno T. M. Silva & Marcio Eisencraft,* Escola Politécnica - USP, São Paulo-SP, Brazil.

TS-04 – Chaos and Global Phenomena – II

Room: S1
Chair: *Iberê Luiz Caldas*, IF, USP, São Paulo, Brazil

- 8h30-8h50: TS-04-1 - **A Dynamical Approach to Time Series with Fluctuating Statistical Parameters;** *Ivan Roa Gonzalez*, UFPE, Brazil; *Giovani Lopes Vasconcelos*, UFPE, Brazil; *Antonio Murilo Macedo*, UFPE, Brazil.
- 8h50-9h10: TS-04-2 - **Spectral properties of temporal evolution of brain network structure**; *Rong Wang*, Xi'an Jiaotong University, P. R. China; *Pan Lin*, Xi'an Jiaotong University, P. R. China; *Ying Wu*, Xi'an Jiaotong University, P. R. China.
- 9h10-9h30: TS-04-3 – **Dynamical potentials for non-equilibrium stationary states driven by multiplicative stochastic processes**;

Daniel Barci, University of the State of Rio do Janeiro, Brazil; *Miguel Moreno*, UERJ, Brazil; *Zochil González Arenas*, UERJ; Brazil.

- 9h30-9h50: TS-04-4 – **Detecting dynamical changes in data streams**; *Fausto Guzzo da Costa*, USP, Brazil; *Rodrigo Mello*, USP, Brazil.
- 9h50-10h10: TS-04-5 – **Set Stability of Fixed Points for Discrete Maps**; *Bruno Ossalin Paiva*, Universidade Federal de São João del Rei, Brazil; *Erivelton Geraldo Nepomuceno*, UFSJ, Brazil; *Gleison Amaral*, UFSJ, Brazil.

10h30-10h45 – Coffee-Break

10h45-12h15 – Plenary Talks

Room: FM

- 10h45-11h30: P-04 – ***Miguel Sanjuán,*** King Juan Carlos University, Mósteles, Madrid, Spain;
  Basin Entropy: A new tool to explore uncertainty in dynamical systems.
- 11h30-12h15: P-05 - ***Lev A. Ostrovsky***, National Oceanic and Atmospheric Administration (NOA), Boulder, CO, USA;
  Acoustic radiation force, dynamics of particles and bubbles in acoustic field, and biomedical applications.

12h15-13h30 – Lunch

13h30-15h30 – Poster Session I

15h30-15h45 – Coffee-Break

15h45-16:30 – Plenary Talks

Room: FM

- 15h45-16h30: P-06 – ***José Roberto Castilho Piqueira***, Escola Politécnica, USP, Brazil;
  Hopf bifurcation and chaos in a third-order phase-locked loop

16h30-18h30 – Parallel Sessions: Minisymposia and Contributive Sessions

MS-03 – Dynamics and synchronization in complex networks – III/III

Room: FM
Organizers: *Rafael Soares Pinto*, USP, São Carlos, Brazil *and Tiago Pereira*, USP, São Carlos, Brazil

- 16h30-17h00: **Hidden symmetries in coupled cell network vector fields;** *Eddie Nijholt*, Department of Mathematics, VU University Amsterdam, The Netherlands;
- 17h00-17h30: **Dynamics of phase oscillator populations with heterogeneous phase lags**; *Christian Bick*, College of Engineering, Mathematics and Physical Sciences University of Exeter, Exeter, United Kingdom;
- 17h30-18h00: **Chimera states from explosive synchronization,** *Rafael Soares Pinto*, Tiago Pereira & Jaap Eldering, ICMC-USP, São Carlos-SP, Brazil;
- 18h00-18h30: **Stochastic Quasispecies Model: Form Self-Replicating Polynucleotides to RNA viruses;** *Fernando Antoneli*, Laboratório de Genômica Evolutiva e Biocomplexidade & DIS Escola Paulista de Medicina – Unifesp, São Paulo-SP, Brazil.

MS-05 – Computational Neuroscience

Room: RH
Organizers: *Leandro Alexandre da Silva*[1] *& Rafael Dias Vilela*[1]
[1]UFABC, Santo André -SP, Brazil.

- 16h30-17h00: **Collective Dynamics suppresses Fluctuations**; *Tiago Pereira da Silva*, USP, São Carlos-SP, Brazil;
- 17h00-17h30: **Conditional Lyapunov Exponents for Izhikevich Neuronal Model**; *Filipe I. Fazanaro*, *Ricardo Suyama & Diogo Soriano,* CECS/UFABC, Santo André-SP, Brazil;
- 17h30-18h00: **Colored noise and memory effects on formal spiking neuron models;** *Leandro Alexandre da Silva & Rafael Dias Vilela*, UFABC, Santo André-SP, Brazil;
- 18h00-18h30: **On the beneficial role of memory for signal detection by threshold systems**; *Leandro Alexandre da Silva & Rafael Dias Vilela*, UFABC, Santo André-SP, Brazil;

TS-06 – Control in Chaos and Complex Systems

Room: S1
Chair: Leonardo Santos, CEMADEN, São José dos Campos, SP

- 16h30-16h50: TS-06-1 - **Supernovae Automatic Classification Method by Modeling Human Analysis using Artificial Neural Networks**; *Marcelo Módolo,* INPE, Brazil; *Lamartine Nogueira Frutuoso Guimarães*, IEAv, Brazil; *Reinaldo Rosa*, INPE, Brazil.

- 16h50-17h10: TS-06-2 - **Reactive model for convergence of active agents to moving formations**; *Vander Freitas*, INPE, Brazil; *Elbert E. N. Macau*, INPE, Brazil.
- 17h10-17h30: TS-06-3 – **Complexity Reduction for An Optimal Stopping Problem: A Two-Time-Scale Approach**; *Qing Zhang,* University of Georgia, USA; *George Yin*, Wayne State University, USA.
- 17h30-17h50: TS-06-4 – **Modeling the atmospheric turbulence with intermittency**; *Haroldo Campos Velho*, INPE, Brazil; *Reinaldo Rosa*, INPE, Brazil; *Fernando Ramos*, INPE, Brazil; *Roger Pielke Sr.*, CIRES, USA.
- 17h50-18h10: TS-06-5 – **Nonlinear suboptimal controller design for chaotic motions of mobile robot formations**; *Elvira Rafikova*, UFABC, Brazil; *Marat Rafikov*, UFABC, Brazil; *Guilherme Rinaldo*, UFABC, Brazil.

May, 18th 2016, Wednesday

8h30-10h30 – Parallel Sessions: Minisymposia and Contributive Sessions

MS-06 – Complex Networks as an Interdisciplinary Tool on Measurement of Critical Infrastructure's Vulnerability Against Natural Disasters – I/II

Room: FM
Organizer: *Leonardo B. L. Santos*, Cemaden/MCTI, São José dos Campos -SP, Brazil;

- 8h30-9h00: **Conceptual Interfaces Between The Natural Disaster Terminology And Complex Systems Theory**; *Luciana R. Londe & Leonardo B. L. Santos,* CEMADEN, São José dos Campos-SP, Brazil;
- 9h00-9h30: **Pghydro – Hydrographic Objects In Spatial Database Management System**; *Alexandre A. Teixeira*, National Agency of Water-ANA, Brasília-DF, Brazil;
- 9h30-10h00: **Weather Radar Forecasting For Natural Disasters Early Warning At The Scale Of Susceptibility Areas;** *Tiago Carvalho*, *Marcos L. Rodrigues & Jojhy Sakuragi,* CEMADEN, São José dos Campos-SP, Brazil;

TS-07 – Bifurcation Theory and Applications – I

Room: RH
Chair: *Tiago Pereira*, USP, São Carlos, Brazil

- 8h30-8h50: TS-07-1 - **Asymptotic analysis of the everted state of circular cylindrical shell;** *Leonid Srubshchik*, Cooper Union College, USA.
- 8h50-9h10: TS-07-2 - **Stochastic dynamics with multiplicative noise: An analysis on time reversibility**; *Zochil González Arenas*, University of the State of Rio de Janeiro, Brazil; Daniel Barci, UERJ, Brazil.
- 9h10-9h30: TS-07-3 – **Bifurcation and Shock Wave Solutions of Burgers Equation**; *Chunqing Lu,* Southern Illinois University Edwardsville, USA.

- 9h30-9h50: TS-07-4 – **Analytical bifurcation trees of periodic motions to chaos in a periodically driven pendulum**; *Albert Luo*, Southern Illinois University Edwardsville, USA; Yu Guo, Midwestern State University, USA.
- 9h50-10h10: TS-07-5 – **Dynamics and indirect nite-time stability of modi ed relay-coupled chaotic systems**; *Patrick Herve Louodop* , UNESP, Brazil; Hilda Cerdeira, UNESP, Brazil.
- 10h10-10h30: TS-07-6 – **Devil's Staircase in an Optomechanical Cavity**; *Eyal Buks*, Technion, Israel.

TS-08 – Synchronization and Complex Networks - I

Room: S1
Chair: *Marcos Quiles*, UNIFESP, São José dos Campos, Brazil

- 8h30-8h50: TS-08-1 - **Price-setting mixed triopolies**; *Fernanda Ferreira*, Polytechnic of Porto, Portugal; *Flávio Ferreira*, Polytechnic of Porto, Portugal.
- 8h50-9h10: TS-08-2 - **Monitoring of Waste Generated in the Classroom of Uninorte rooms through sensors Ultrasonic and CO^2 in the Recycle Bins**; *Eucriney Albuquerque de Melo*, Centro Universitário do Norte, Brazil;
- 9h10-9h30: TS-08-3 – **Using neuroimaging techniques to reveal the brain complex networks at rest**; *Rickson Coelho Mesquita,* UNICAMP, Brazil; *Sergio Novi Junior*, UNICAMP, Brazil.
- 9h30-9h50: TS-08-4 – **Frequency synchronization in power-grid models of Kuramoto-like model**; *José Mario Vicensi Grzybowski*, Federal University of Fronteira Sul, Brazil; *Elbert E. N. Macau*, INPE, Brazil; *Takashi Yoneyama*, ITA, Brazil.
- 9h50-10h10: TS-08-5 – **Privatization and government preference in a Bertrand model**; *Fernanda Ferreira*, Polytechnic of Porto, Portugal; *Flávio Ferreira*, Polytechnic of Porto, Portugal.

MS-08 – Lie group analysis and its applications

Room: U
Organizer: *Maria Luz Gandarias[1], Maria Santos Bruzón[1] & Chaudry Masood Khalique[2],*
[1]Department of Mathematics, University of Cadiz, Puerto Real, Spain
[2]Department of Mathematical Sciences, North-West University, Mafikeng Campus, Mmabatho, South Africa

- 08h30-09h00: **Some Conservation laws of a Boussinesq equation with strong internal damping**; *Maria Luz Gandarias* & *Maria Rosa*, University of Cadiz, Spain;
- 09h00-09h30: **Nonlinear Self-Adjointness And Conservation Laws Of A Generalized Benjamin-Bona-Mahony-Burgers Equation**; *M.S. Bruzón, T. Garrido & R. de la Rosa*, University of Cádiz, Puerto Real, Spain;
- 09h30-10h00: **Solutions and conservation laws of a class of nonlinear dispersive wave equations;** *Chaudry Masood Khalique*, North-West University, Mafikeng Campus, Mmabatho, South Africa;

- 10h00-10h30: **An optimal system and group-invariant solutions of the Vasicek pricing equation of mathematical finance**; *Tanki Motsepa*, North-West University, Mafikeng Campus, Mmabatho, South Africa;

10h30-10h45 – Coffee-Break

10h45-12:15 – Plenary Talks

Room: FM

- 10h45-11h30: P-07 – ***Martin Mönnigman***, Ruhr-Universität Bochum, Germany;
  Constructive Nonlinear Dynamics: Integrating Applied Bifurcation Theory with Optimization.
- 11h30-12h15: P-08 – ***Lea F. Santos***, Yeshiva University, New York, USA;
  Powerlaw Decays and Thermalization in Chaotic Quantum Systems.

12h15-13h30 – Lunch

May, 19th 2016 – Thursday

8h30-10h30 – Parallel Sessions: Minisymposia and Contributive Sessions

MS-06 – Complex Networks as an Interdisciplinary Tool on Measurement of Critical Infrastructure's Vulnerability Against Natural Disasters – II/II

Room: FM

Organizer: *Leonardo B. L. Santos*, Cemaden/MCTI, São José dos Campos -SP, Brazil;

- 8h30-9h00: **Survivability Evaluation Of Critical Infrastructures** *Daniel S. Menasche*, UFRJ, Rio de Janeiro-RJ, Brazil;
- 9h00-9h30: **Complex Networks In Geographical Information Systems - Crossing Hydrography And Transportation Networks**; *Leonardo B. L. Santos*, *Aurelienne A. Souza Jorge & Beatriz M. M. Silva*, CEMADEN, São José dos Campos-SP, Brazil; *Alessandro C. Miola*, UFSM, Santa Maria-RS, Brazil;

MS-07 – Nonlinear Dynamics Of Conservative And Dissipative Complex Systems – I/II

Room: RH

Organizer: *Ricardo Luiz Viana*, Departamento de Física, Universidade Federal do Paraná, Curitiba-PR, Brazil.

- 8h30-9h00: **Analysis of Plasma Turbulence in Texas Helimak**; *D. L. Toufen*, Federal Institute of Education, Science and Technology of São Paulo, Guarulhos-SP, Brazil; *F. A. Pereira, Z. O. Guimarães-Filho & I. L. Caldas,* Instituto de Física - USP, São Paulo-SP, Brazil; *K. W. Gentle,* Department of Physics and Institute for Fusion Studies, The University of Texas at Austin, Austin-TX, USA.
- 9h00-9h30: **Community detection in complex networks via dynamics**; *Elbert E. N. Macau*, INPE, São José dos Campos-SP, Brazil;
- 9h30-10h00: **Synchronization of nonlinear phase oscillators with coupling mediated by a diffusing substance;** *Carlos Adalberto Schnaider Batista*, UFPR, Pontal do Paraná-PR, Brazil; *José Danilo Szezech Jr. & Antônio Marcos Batista,* UEPG, Ponta Grossa-PR, Brazil; *Elbert E. Nehrer Macau,* INPE, São José dos Campos-SP, Brazil; *Sérgio Roberto Lopes & Ricardo Luiz Viana*, UFPR, Curitiba-PR, Brazil;
- 10h00-10h30: **Control of anomalous transport and stickiness in Hamiltonian systems**; *Taline Suellen Krüger*, *Paulo Paneque Galuzio*, *Thiago de Lima Prado & Ricardo Luiz Viana,* UFPR, Curitiba-PR, Brazil; *José Danilo Szezech Jr.,* UEPG, Ponta Grossa-PR, Brazil; *Sergio Roberto Lopes*, UFPR, Curitiba-PR, Brazil;

TS-05 – Infinite Dimension Systems, Plasma and Turbulence – I

Room: FM

Chair: *Reinaldo Roberto Rosa*, INPE, São José dos Campos, Brazil

- 08h30-08h50: TS-05-1 - **3DBMO: A Time Series Canonical Generator to Study the PSD Dimensional Dependence in Complex Physical Systems;** *Paulo Zeferino*, INPE, Brazil; *Reinaldo Rosa*, INPE, Brazil; *Murilo Dantas*, IFSP, Brazil.
- 08h50-08h10: TS-05-2 – **Perturbative methods in agent based epidemic models**; *Alexandre Martinez,* USP, Brazil; *Gilberto Nakamura*, USP, Brazil.
- 08h10-08h30: TS-05-3 – **High-Order Numerical Approach for Computational Model of the Pressureless Gas Dynamics Equations**; *SungKi Jung,* UFABC, Brazil.
- 08h30-08h50: TS-05-4 – **Scattering theory of walking droplets in the presence of obstacles**; *Remy Dubertrand*, University of Liege, Belgium.
- 08h50-08h10: TS-05-5 – **Discrete Elements on Paralell Multi-core Using Dynamic Particle Flow Simulations to Examine Fresh Concrete and Slump Test Parameters**; *Luiz Carlos Sanches*, UNESP, Brazil.
- 08h10-08h30: TS-05-6 – **Simulating the interaction of a comet with the solar wind using a magnetohydrodynamic model**; *Edgard de Freitas Diniz Evangelista*, INPE, Brazil; *Margarete Domingues*, INPE, Brazil; *Odim Mendes*, INPE, Brazil; *Oswaldo Duarte Miranda*, INPE, Brazil.

10h30-10h45 – Coffee-Break

10h45-12:15 – Plenary Talks

Room: FM

- 10h45-11h30: P-09 – ***Luis Fernando Costa Alberto***, USP de São Carlos, Brazil;
  Avoiding Blackouts with Theory of Stability Regions.
- 11h30-12h15: P-10 – ***J. A. Tenreiro Machado***, Politécnica do Porto, Porto, Portugal;
  Fractional calculus and applications

12h15-13h30 – Lunch

13h30-15h30 – Poster Session II

15h30-15h45 – Coffee-Break

15h45-16:30 – Plenary Talks

Room: FM

- 15h45-16h30: P-11 – ***J. M. Martínez,*** IMECC, UNICAMP, Brazil;
  Complexity in Unconstrained and Constrained Optimization.

Room: RH

- 15h45-16h30: P-12 – **Matteo Tanzi**, Imperial College, London, UK;
  Expanding Dynamics on Heterogeneous Networks: Mean Field Reduction and Synchronisation.

16h30-18h30 – Parallel Sessions: Minisymposia and Contributive Sessions

TS-09 – Synchronization and Complex Networks – II

Room: S1

Chair: *Ricardo Viana*, UFPR, Curitiba, Brazil

- 16h30-16h50: TS-09-1 - **Lyapunov spectrum of chaotic maps with a coupling mediated by a diffusing substance**; *Ricardo Viana,* UFPR,

Brazil; *Carlos Batista*, UEPG, Brazil; *Antonio Batista*, UEPG, Brazil; *Kelly Iarosz*, USP, Brazil.

- 16h50-17h10: TS-09-2 - **Hurst exponent estimation of self-affine time series through a complex network approach**; *Andriana Campanharo*, UNESP, Brazil; *Fernando Ramos*, INPE, Brazil.
- 17h10-17h30: TS-09-3 **– On the Fundamental Characteristics of Complex Network with Multi-Agent Constituents**; *Chun-Lin Yang,* Texas A&M University, USA; *C. Steve Suh*, Texas A&M University, USA.
- 17h30-17h50: TS-09-4 - **The influence of hubs in the structure of a neuronal network during an epileptic seizure**; *Abner Rodrigues*, USP, Brazil; *Hilda Cerdeira*, UNESP, Brazil; *Birajara Machado*, Hospital Israelita Albert Einstein, Brazil.
- 17h50-18h10: TS-09-5 – **Complex Network Into Geographical Information Systems;** *Beatriz da Silva*, FATEC, Brazil; *Lucas Valerio*, UNESP, Brazil; *Maria Jurema*, UNESP, Brazil; *Leonardo Santos*, CEMADEN-MCTI, Brazil.
- 17h10-18h30: TS-09-6 **– A geographically-aware complex network approach for foot-and-mouth disease phylodynamics**; *Luiz Max F. de Carvalho,* University of Edinburgh, United Kingdom; *Leonardo Santos*, CEMADEN-MCTI, Brazil; *Paulo E. P. Burke*, UNIFESP, Brazil; *Marcos Quiles*, UNIFESP, Brazil; *Waldemir de Castro Silveira*, Trimatrix LTDA, Brazil.

TS-10 – Nonlinear Dynamical Systems and Application – II

Room: RH

Chair: *Kelly Cristiane Iarosz*, USP, São Paulo, Brazil

- 16h30-16h50: TS-10-1 - **Charge Behavior Analysis In Ball Mills By Using Torque Signal - An Alternative To Increase The Efficiency Of Ball Mills;** *Luiz Carlos Silva*, UFABC, Brazil; *Jesus Franklin Andrade Romero*, UFABC, Brazil; *Gustavo Taets Nascimento*, UFABC, Brazil; *Thiago de Oliveira Pistola*, UFABC, Brazil.
- 16h50-17h10: TS-10-3 – **Nonlinear damping in MEMS/NEMS beam resonators resulting from clamping loss**; *Andre Gusso,* UFF, Brazil; *Jéssica Pimentel*, UFF, Brazil.
- 17h10-17h30: TS-10-4 – **Investigating the helicopter dynamics by bred vector**; *Ivana Sumida*, INPE, Brazil; *Thiago Ritto*, UFRJ, Brazil; *Haroldo Campos Velho*, INPE, Brazil.
- 17h30-17h50: TS-10-5 – **Invariant solutions of (2+1) dimensional modified dispersive water wave system**; *Sachin Kumar*, Central University of Punjab, India.
- 17h50-18h10: TS-10-6 – **Estimation of pitch period in voice signals using Poincaré section**; *Fernando Sobrinho*, Instituto Federal do Sul de Minas, Brazil; *Maria Dajer*, UTFPR, Brazil; *Luis Alberto*, USP, Brazil.

TS-11 – Modeling, Numerical Simulation and Optimization – I

Room: S1

Chair: *José Tenreiro Machado*, Polytechnic of Porto, Portugal.

- 16h30-16h50: TS-11-1 - **Multiobjective optimization application in DOE problems with multiple responses;** *Douglas Rodrigues*, INPE, Brazil; *Aneirson Silva*, UNESP, Brazil; *Fernando Augusto Marins*, UNESP, Brazil; *Rafael de Carvalho Miranda*, UNIFEI, Brazil; *Erica Dias*, UNESP, Brazil; *José Roberto D. Luche*, UNESP, Brazil.
- 16h50-17h10: TS-11-2 - **A delayed p53 ubiquitination induced via c-Myc-ARF interaction pathway**; *Md Jahoor Alam*, University of Hail, Kingdom of Saudi Arabia.
- 17h10-17h30: TS-11-3 – **Excitatory and Inhibitory Synapses in Coupled Model Neurons**; *Epaminondas Rosa,* Illinois State University, USA, *Rosangela Follmann*, Illinois State University, USA.
- 17h30-17h50: TS-11-4 – **Uncertainty Analysis of Smart Composite Materials**; *Fabian Andres Lara Molina*, Federal Technological University of Paraná, Brazil; *Edson Hideki Koroishi*, UTFPR, Brazil; *Albert Willian Faria*, UFTM, Brazil.
- 17h50-18h10: TS-11-5 – **Fractional-Order Models for Vegetable Tissues**; *José Tenreiro Machado*, Polytechnic of Porto, Portugal; *Antonio Lopes*, Universidade do Porto, Portugal.
- 18h10-18h30: TS-11-6 – **Parametric excitation of offshore riser using reduced-order models based on Bessel-type modes: calibration of hydrodynamic coefficients**; *Guilherme Franzini*, USP, Brazil; *Thiago Dias*, USP, Brazil; *Carlos Mazzilli*, USP, Brazil; *Celso Pesce*, USP, Brazil.

May, 20th 2016 – Friday

8h30-10h30 – Parallel Sessions: Minisymposia and Contributive Sessions

MS-07 – Nonlinear Dynamics Of Conservative And Dissipative Complex Systems

Room: FM

Organizer: *Ricardo Luiz Viana*, Departamento de Física, Universidade Federal do Paraná, Curitiba-PR, Brazil.

- 8h30-9h00: **Escape time and transport in E x B drift motion;** *R. S. Oyarzabal*, *J. D. Szezech Jr,* Department of Physics-UEPG, Ponta Grossa-PR, Brazil; *A. M. Batista,* Department of Mathematics and Statistics-UEPG, Ponta Grossa-PR, Brazil; *S. L. T. de Souza,* UFSJ, Ouro Branco-MG, Brazil; *I. L. Caldas,* USP, São Paulo-SP, Brazil; *R. L. Viana,* UFPR, Curitiba-PR, Brazil; *M. A. F. Sanjuán,* Universidad Rey Juan Carlos, Móstoles, Madrid, Spain;
- 9h00-9h30: **Coexistent subharmonic resonant modes of a forced bilinear oscillator**; *Tiago Kroetz*, UTFPR, Pato Branco-PR, Brazil; *Ricardo Luiz Viana*, UFPR, Curitiba-PR, Brazil;

TS-12 – Bifurcation Theory and Applications – II

Room: RH

Chair: *Thiago Prado*, INPE, São José dos Campos, SP

- 8h30-8h50: TS-12-1 - **Analysis of a Temperature Dependent Multi Stable Pendulum System;** *Dimitri Costa*, UFRJ, Brazil; *Marcelo Savi*, UFRJ, Brazil.
- 8h50-9h10: TS-12-2 - **Conditional Lyapunov Exponents for Izhikevich Neuronal Model**; *Filipe Fazanaro*, UFABC, Brazil; *Ricardo Suyama*, UFABC, Brazil; Diogo Soriano, UFABC, Brazil.
- 9h10-9h30: TS-12-3 **– Eigenvalue analysis of a simple flexible rotor**; *Renan Correa,* Federal Technological University of Paraná, Brazil; *Edson Hideki Koroishi*, UTFPR, Brazil; *Fabian Andres Lara Molina*, UTFPR, Brazil; *Elenice Stiegelmeier*, UTFPR, Brazil.
- 9h30-9h50: TS-12-4 - **Simulations and details of a physical prototype addressing the influence of kinematic redundancy on a parallel robot**; *João Santos*, USP, Brazil; *Maíra da Silva*, USP, Brazil.
- 9h50-10h10: TS-12-5 **– Influence of Sample Rate and Discretization Methods in the Identification of Systems with Hysteresis**; *Wilson Junior,* UFSJ, Brazil; *Lucas Giovani Nardo*, UFSJ, Brazil; *Vinícius da Silva Borges*, UFSJ, Brazil; *Alisson Daniel de Macedo Vitor*, UFSJ, Brazil; *Samir A. M. Martins*, UFSJ, Brazil.

TS-13 – Synchronization and Complex Networks - III

Room: S1

Chair: *José Mendes*, Universidade de Aveiro, Portugal

- 8h30-8h50: TS-13-1 - **Building phase synchronization equivalence between coupled bursting neurons and phase oscillators;** *Fabiano Ferrari***,** UFVJM, Brazil; *Ricardo Viana*, UFPR, Brazil.
- 8h50-9h10: TS-13-2 - **Collective dynamics in two populations of noisy oscillators with asymmetric interactions**; *Bernard Sonnenschein*, Humboldt University, Germany; *Thomas Peron*, USP, Brazil; *Francisco Rodrigues,* USP, Brazil; *Juergen Kurths*, Humboldt University, Germany; *Lutz Schimansky Geier*, Humboldt University, Germany.
- 9h10-9h30: TS-13-4 **– Structural Properties of Multiplex Networks**; *José Mendes,* Universidade de Aveiro, Portugal
- 9h30-09h50: TS-13-5. – **Ranking scientists**; *José Fernando Mendes*, Universidade de Aveiro, Portugal; *Sergey Dorogovtsev*, Universidade de Aveiro, Portugal.

10h30-10h45 – Coffee-Break

10h45-12:15 – Plenary Talks

Room: FM

- 10h45-11h30: P-13 – ***Mike Field***, Imperial College London, London, United Kingdom and Rice University, Houston, USA;
  A Modularization of dynamics theorem for asynchronous networks.

- 11h30-12h15: P-14 – ***Albert C. J. Luo***, Southern Illinois University, USA; Complete route of period-1 motions to chaos in a time-delayed Duffing oscillator.

12h15-13h30 – Lunch

13h30-15h30 – Parallel Sessions: Minisymposia and Contributive Sessions

TS-14 – Modeling, Numerical Simulation and Optimization – II

Room: FM
Chair: Kelly Cristiane Iarosz, USP, São Paulo, Brazil

- 13h30-13h50: TS-14-1 - **A Short-Term Load Forecasting Model Based In Support Vector Machines;** *Ricardo Salgado*, UNIFAL, Brazil; *Takaaki Ohishi*, UNICAMP, Brazil.
- 13h50-14h10: TS-14-2 - **Comparative Study Of Short-Term Load Forecasting Models**; *Ricardo Salgado*, UNIFAL, Brazil; *Takaaki Ohishi*, UNICAMP, Brazil.
- 14h10-14h30: TS-14-3 – **A Monthly Streamflow Forecasting Model Using Bayesian Inference Theory**; *Ricardo Salgado*, UNIFAL, Brazil; *Bethânia Brito*, UNIFAL, Brazil; *Luiz Alberto Beijo*, UNIFAL, Brazil.
- 14h30-14h50: TS-14-4 – **Signal Propagation in Axons**; *Rosangela Follmann*, Illinois State University, USA; *Epaminondas Rosa*, Illinois State University, USA; *Wolfgang Stein*, Illinois State University, USA.
- 14h50-15h10: TS-14-5 – **Extending Numerical Solutions Of Potential Fields Method Based On Boundary Value Problems For 3d Environments**; *Marcelo O. Silva*, USP, Brazil; *Lucas Tomazela*, USP, Brazil; *Roseli F. Romero*, USP, Brazil.

TS-15 – Nonlinear Dynamical Systems and Application – III

Room: RH
Chair: *Liang Zhao*, USP, Brazil;

- 13h30-13h50: TS-15-1 - **Particle Trajectories Driven By Drift-Waves in Sheared Flows;** *Kaue Cabrera Rosalem*, ITA, Brazil; *Marisa Roberto*, ITA, Brazil; *Iberê Luiz Caldas*, USP, Brazil.
- 13h50-14h10: TS-15-2 - **Features of edge-centric collective dynamics in machine learning tasks**; *Liang Zhao*, USP, Brazil; *Filipe Verri*, USP, Brazil; *Paulo Urio*, USP, Brazil.
- 14h10-14h30: TS-15-3 – **Stationarity breaking in biological coupled physical systems in mice sleep revealed by recurrence analysis**; *Thiago Prado,* UFPR, Brazil; *Sergio Lopes*, UFPR, Brazil.
- 14h30-14h50: TS-15-4 – **Control of extreme events in the bubbling onset of wave turbulence**; *Paulo Galuzio*, UFPR, Brazil; *Ricardo Viana*, UFPR, Brazil; *Sergio Lopes*, UFPR, Brazil.
- 14h50-15h10: - **Community detection using coupled Kuramoto oscillators with conditional repulsion;** *João Eliakin Mota de Oliveira*, INPE, Brazil; *Marcos Daniel N. Maia*, INPE, Brazil; *Elbert E. N. Macau*, INPE, Brazil; Marcos G. Quiles, UNIFESP, Brazil.
- 15h10-15h30: TS-15-6 – **Watershed delineation – inverse problem and stochastic approach**; *Leonardo B. L. Santos*, CEMADEN, Brazil; *Tiago N. S. Miranda*, FATEC, Brazil; *Lucas V. Oliveira*, UNESP, Brazil; *Maria C. B. Jurema*, UNESP, Brazil; *Solon V. Carvalho*, INPE, Brazil.

TS-16 – Infinite Dimension Systems, Plasma and Turbulence – II

Room: S1
Chair: *Margarete Domingues*, INPE, São José dos Campos, Brazil

- 13h30-13h50: TS-16-1 - **On the verification of an adaptive three-dimensional magnetohydrodynamic model;** *Anna Karina Gomes*, INPE, Brazil; *Margarete Domingues*, INPE, Brazil; *Odim Mendes*, INPE, Brazil.
- 13h50-14h10: TS-16-2 - **The Characteristic Based Split scheme applied to solve the Navier-Stokes equations.**; *Gustavo Baggio*, UNESP, Brazil; *João Campos Silva*, UNESP, Brazil; *João Batista Aparecido*, UNESP, Brazil.
- 14h10-14h30: TS-16-3 – **Characterization of inhomogeneous turbulence from fluctuations of density and electromagnetic fields in space plasmas**; *Reinaldo Rosa,* INPE, Brazil.
- 14h30-14h50: TS-16-4 – **A new second order local time scheme for numerical simulations of evolutionary partial differential equations with ocalized physical phenomena**; *Müller Lopes*, INPE, Brazil; *Margarete Domingues*, INPE, Brazil; *Odim Mendes*, INPE, Brazil.
- 14h50-15h10: TS-16-5 –**Quality Denoising Heart Signal Experimentally Acquired,** *Guênia Ladeira*, Universidade Federal de Uberlândia, Brazil;
- 15h10-15h30: TS-16-6 – **Lagrangian Dynamics of Separation Bubble in Its Evolution from Generating to Breaking**; *Jiazhong Zhang*, Xi'an Jiaotong University, P. R. China.

15h30-15h45 – Coffee-Break

15h45-17h15 – Plenary Talks

Room: FM

- 15h45-16h30: P-15 – **Thomas Kapitaniak**, Technical University of Lodz, Poland
  Synchronization of pendula: From Huygens to chimeras
- 16h30-17h15: P-16 – ***Gonzalo M. Ramirez-Ávila***, Universidad Mayor de San Andrés, La Paz, Bolivia;
  Arithmetic progression of spiking and bursting in Rulkov's Model

17h15-17h30 – Poster Award and Closing Ceremony

Poster Sessions

Poster Section I:

Chair: *Thiago Prado*, INPE, São José dos Campos, Brazil

Analysis and Control of Nonlinear Dynamical Systems with Practical Applications

- P-1-01: **Synchronization detection and characterization through mixed state embedding and recurrence quantification analysis**; *Leonardo Portes dos Santos*, UFMG, Brazil; *Luis Aguirre*, UFMG, Brazil.
- P-1-02: **Integrable classical restricted two-center MICZ-Kepler problem on surfaces of revolution**; *Yeva Gevorgyan*, UNESP, Brazil.
- P-1-03: **Discrete Complex Wavelet Approach Applied to Phase Synchronization on Solar Parameters**; *Maria Teodora Ferreira*, Faculdade Bilac e Univap, Brazil.
- P-1-04: **Simulation of Chua's Circuit by Means of Interval Analysis;** *Melanie Silva*, UFSJ, Brazil; *Erivelton Geraldo Nepomuceno*, UFSJ, Brazil; *Gleison Amaral*, UFSJ, Brazil; *Valceres Silva*, UFSJ, Brazil.
- P-1-05: **Nonlinear Particle Filter Applied to Orbit Determination of Artificial Satellites**; *Paula Pardal*, USP, Brazil; *Helio Kuga*, ITA/DCTA, Brazil; *Rodolpho Vilhena de Moraes*, UNIFESP, Brazil.
- P-01-06: **Analysis of the gravitational potential and the equilibrium points of the asteroid 2063 Bacchus**; *Tamires de Moura*, UNESP, Brazil; *Othon Winter*, UNESP, Brazil;
- P-01-07: **Order-Chaos-Order Transition in a Spring Pendulum**; *Francisco Marcus*, USP, Brazil; *Meirielen de Sousa*, USP, Brazil; *Iberê Luiz Caldas*, USP, Brazil;
- P01-08: **Suspension system in a spray boom using a fractional PID controller**; *Leonardo Magalhães*, USP, Brazil; *Sergio David*, USP, Brazil; *Rafael Sousa*, USP, Brazil; *Rubens Tabile*, FZEA-USP, Brazil.
- P01-09: **Synchronization detection and characterization through mixed state embedding and recurrence quantification analysis;** *Leonardo Portes dos Santos*, UFMG, Brazil; *Luis Aguirre*, UFMG, Brazil;
- P01-10: **On Nonlinear Oscillations Modelling in Structural Enginering and Solar Corona**; *Marcelo de Juli*, Universidade Presbiteriana Mackenzie, Brazil.
- P01-11: **Extension of the Invariance Principle for Switched Delay Systems;** *Michele Valentino*, Paraná Federal Technology University, Brazil.
- P01-12: **Parametric Dynamics of an Euler-Bernoulli Beam**; *Lílian Ribeiro*, UFSJ, Brazil; *Adelcio Oliveira*, UFSJ, Brazil.
- P01-13: **Analysing fractal basin boundaries in the Copenhagen problem;** *Sheila Assis*, Instituto Federal de Educação, Ciência e Tecnologia Catarinense IFC, Brazil; *Maísa de Oliveira Terra*, ITA, Brazil;
- P01-14: **Implementing the swarm algorithm in multi robots**; *Amir Hossein Omidvar,* UFABC, Brazil; *Luiz Martins Filho*, UFABC, Brazil; *Annibal Hetem Jr.*, UFABC, Brazil; *Atena Amanati Shahri*, UFABC, Brazil.

- P01-15: **Development of Contact Interaction-based Navigation of Mobile Robots**; *Atena Amanati Shahri*, UFABC, Brazil; *Luiz Martins Filho*, UFABC, Brazil; *Leandro Baroni*, UFABC, Brazil; *Amir Hossein Omidvar*, UFABC, Brazil;
- P01-16: **Kinetic instabilities in the electrochemical reform**; *José Cruz*, USP, Brazil; *Mayara Prado*, USP, Brazil; *Hamilton Varela*, USP, Brazil;
- P01-17: **Periodic Control Applied To The Attitude Control Of The Serpens II Mission**; *Felipe Coelho*, UFSM, Brazil; *André Luís da Silva*, UFABC, Brazil.
- P01-18: **Using micro and nanoresonators as pseudo-random numbers generators**; *Wellington Dantas*, UFF, Brazil; *André Gusso*, UFF, Brazil.
- P01-19: **Energy distribution in a spring pendulum**; *Meirielen de Sousa*, USP, Brazil; *Francisco Marcus*, USP, Brazil; *Iberê Luiz Caldas*, USP, Brazil.
- P01-20: **Interaction of scroll waves in an excitable medium**; *Nirmali Das*, IIT-Guwahati, India.
- P01-21: **Thermal Lattice Boltzmann Method for Dilute Fluids of Bosons and Fermions**; *Rodrigo Coelho*, UFRJ, Brazil; *Mauro Doria*, UFRJ, Brazil; *Anderson Ilha*, INMETRO, Brazil.
- P01-22: **A Lattice Boltzmann Method for Electrons in Metals**; *Rodrigo Coelho*, UFRJ, Brazil; *Anderson Ilha*, INMETRO, Brazil; *Mauro Doria*, UFRJ, Brazil.
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Bifurcation Analysis and Applications

- P01-23: **Simulation of Recursive Functions by Means of Interval Analysis and Pseudo-Orbits**; *Heitor Rodrigues Junior*, UFSJ, Brazil; *Márcia Peixoto*, UFSJ, Brazil; *Erivelton Geraldo Nepomuceno*, UFSJ, Brazil.
- P01-24: **Experimental results of the Chuas circuit**; *F.F.G Sousa*, IFSULDEMINAS, Brazil; *R.M. Rubinger,* UNIFEI, Brazil.
- P01-25: **Analysis of shear instability inside a flow driven by a cylindrical cavity**; *Waleed Mouhali*, ECE Paris, School of Engineering, France; *Thierry Lehner*, LUTH, France.
- P01-26: **Shearless bifurcation on symplectic map with a local null rotation number**; *Bruno Figueiredo Bartoloni*, USP, Brazil; *Iberê Luiz Caldas*, USP, Brazil.
- P01-27: **Complex dynamics in an electrochemical N-NDR oscillator**; *Alana Zülke*, USP, Brazil; *Hamilton Varela*, USP, Brazil; *Jason Gallas*, UFPB, Brazil.
- P01-28: **Mascons to find equilibrium points around small bodies of irregular shape**; *Gabriel Borderes Motta*, UNESP, Brazil; *Othon Winter*, UNESP, Brazil.
- P01-29: **Determination of asteroid shapes from lightcurves**; *Victor Lattari*, UNESP, Brazil.
- P01-30: **Chaos and hyperchaos in a reduced model of hydromagnetic convection**; *Francis F. Franco*, ITA, Brazil; *Erico L. Rempel*, ITA, Brazil

Celestial Mechanics and Dynamical Astronomy

- P01-31: **Magnetohydrodynamic equilibria with gravitational forces in symmetric systems**; *Fabiane Carvalho*, UFPR, Brazil; *Ricardo Viana*, UFPR, Brazil.
- P01-32: **The radial distribution of the dusty rings of Uranus**; *Rafael Sfair*, UNESP, Brazil; *Bruno Sicardy*, LESIA, France.
- P01-33: **Planetary formation in a coplanar triple stellar system**; *Luana Mendes*, UNESP, Brazil; *Rita Domingos*, UNESP, Brazil; *Othon Winter*, UNESP, Brazil; *André Izidoro*, UNESP, Brazil; *André Amarante*, UNESP e USP, Brazil.
- P01-34: **Alternative Paths to Reach Asteroids**; *Saymon Santana*, INPE, Brazil; *Cristiano de Melo*, UFMG, Brazil; *Elbert E. N. Macau*, INPE, Brazil; *Othon Winter*, UNESP, Brazil.
- P01-35: **Study of the dynamic of micrometric particles in the arcs of Neptune's Adams ring**; *Gustavo Madeira,* UNESP, Brazil*; Silvia M. G. Winter*, UNESP, Brazil.
- P01-36: **Hydrodynamics formation of the Gamma Cephei b;** *Bárbara Camargo***,** UNESP, Brazil; *Ricardo Moraes*, UNESP, Brazil; *Othon Winter*, UNESP, Brazil; *Dietmar Foryta*, UFPR, Brazil.
- P01-37: **Testing anomalous diffusion models for simulation of cosmological density fluctuation spectra**; *Reinaldo Rosa*, INPE, Brazil; *Solon Carvalho*, INPE, Brazil; *Fernando Oliveira*, UnB, Brazil; *Mariana Pelissari Monteiro Aguiar Baroni*, IFSP, Brazil; *Diego Stalder Díaz*, INPE, Brazil.
- P01-38: **Testing the REBOUND in the Nice Model;** *Rafael Sousa*, UNESP, Brazil; *Ernesto Vieira Neto*, UNESP, Brazil.
- P01-39: **Study of Sailboat for binaries systems;** *Tiago F.L.L. Pinheiro*, UNESP, Brazil; *Rafael Sfair*, UNESP, Brazil.

Poster Section II:

Chair: *Rosana Araújo*, INPE, São José dos Campos, Brazil

Chaos and Global Nonlinear Dynamics

- P02-01: **Revisiting Hammel et al. (1987): Does the shadowing property hold for modern computers?**; *Bruno Silva*, UFSJ, Brazil; *Felipe Milani*, UFSJ, Brazil; *Erivelton Geraldo Nepomuceno*, UFSJ, Brazil; *Samir A. M. Martins*, UFSJ, Brazil; *Gleison Amaral*, UFSJ, Brazil.
- P02-02: **Dynamical Characterization Of Nonlinear Systems Through Complex Networks**; *Juliana Lacerda*, INPE, Brazil; *Vander Freitas*, INPE, Brazil; *Elbert E. N. Macau*, INPE, Brazil.
- P02-03: **An Alternative Method for the Dimension Calculation of Fractal Basin Boundaries**; *Vitor de Oliveira*, UFABC, Brazil; *Rafael Vilela*, UFABC, Brazil.

- P02-04: **Analysis of Coupled Drill-String Vibrations Using a Nonsmooth System**; *Luciano Moraes*, Centro Federal de Educação Tecnológica, Brazil; *Marcelo Savi*, UFRJ, Brazil.
- P02-05: **A web framework for advanced and intensive nonlinear time series analysis**; *Bruno Leonor*, INPE, Brazil; *Walter Abrahão dos Santos*, INPE, Brazil; *Asiel Bomfin Jr*, INPE, Brazil; *Reinaldo Rosa*, INPE, Brazil.
- P02-06: **Associative wavelets and complex networks detection of periodic windows in the logistic map: preliminary studies**; *Luciano Magrini*, INPE, Brazil; *Elbert E. N. Macau*, INPE, Brazil; *Margarete Domingues*, INPE, Brazil.
- P02-07: **Gradient pattern analysis of coupled map lattices**; *Rubens Sautter*, INPE, Brazil; *Pedro Batista*, IFSP, Brazil; *Reinaldo Rosa*, INPE, Brazil.
- P02-08: **Fractal structures in a model for E x B drift motion of charged particles in magnetized plasmas**; *Amanda Mathias*, UFPR, Brazil; *Ricardo Viana*, UFPR, Brazil; *Iberê Luiz Caldas*, USP, Brazil; *Tiago Kroetz*, USP, Brazil.

Climate Dynamics

- P02-09: **Manufacturing Optimization Using Coupled Lot Sizing and Stock Cutting Problems**; *Glaucia Bressan*, Universidade Tecnológica Federal do Paraná, Brazil; *Giovanna Salvadeo*, UTFPR, Brazil; *Roberto Souza*, UTFPR, Brazil.
- P02-10: **Cross-Sample Entropy Analysis for Oceanic Niño Index Data**; *Stéfano Silva*, IFMT, Brazil; *Raine Oliveira*, IFMT, Brazil; *Amanda Souza*, IFMT, Brazil; *Karla Morales*, IFMT, Brazil; *Manoel Moreira*, IFMT, Brazil.
- P02-11: **Bred Vector applied to the atmospheric dynamics;** *Luis Romero,* INPE, Brazil*; Sandra A. Sandri,* INPE, Brazil*; Haroldo F. De Campos Velho,* INPE, Brazil*; Rosângela S. C. Cintra;* INPE, Brazil*; Saulo R. Freitas*, INPE, Brazil.

Complex Networks

- P02-12: **Study of Communities in a Real Brain Network**; *Ewandson Lameu*, UEPG, Brazil.
- P02-13: **Effect of plasticity on the neuronal firing**; *Paulo Ricardo Protachevicz*, UEPG, Brazil; *Fernando da Silva Borges*, UEPG, Brazil; *Kelly Iarosz*, USP, Brazil; *Antonio Batista*, UEPG, Brazil; *Iberê Luiz Caldas*, USP, Brazil; *Ricardo Luiz Viana*, UFPR, Brazil.
- P02-14: **Relation Between Autocorrelation Sequence and Average Shortest-Path Length in a Time Serie to Network Mapping**; *Marcio Eisencraft*, USP, Brazil; *Amanda Camargo*, UFABC, Brazil.
- P02-15: **Time series from text co-occurrence networks**; *Camilo Akimushkin*, Instituto de Física de São Carlos, Brazil; *Diego Amancio*, USP, Brazil; *Osvaldo de Oliveira Jr.*, USP, Brazil.
- P02-16: **Cluster formation dynamics of heterogeneous agents**; *Alcides Castro e Silva*; UFOP, Brazil; *Everaldo Arashiro*, FURG, Brazil; *Eduardo Barbosa*, UFOP, Brazil; *Carlos Saraiva Pinheiro*, UFPO, Brazil.
- P02-17: **Properties of agent based epidemic models using coherent states**; *Gilberto Nakamura*, USP, Brazil; *Alexandre Martinez*, USP, Brazil.

- P02-18: **Investigating The Origin And Behavior Of Spontaneous Activities Of The Brain With Optical Methods**; *Sergio Novi Junior*, UNICAMP, Brazil; *Rickson Coelho Mesquita*, UNICAMP, Brazil.
- P02-19: **The local dynamic effect on frequecy synchronization of neuronal networks**; *Fabiano Ferrari*, UFVJM, Brazil; *Ricardo Viana*, UFPR; Brazil.
- P02-20: **Carrying capacity and accumulation of hubs in networks**; *Helder L. Casa Grande*, *Masayuki O. Hase*, Grupo de Modelagem de Sistemas Complexos – EACH/USP, São Paulo, Brazil.

Control in Complex Systems

- P02-21: **Dynamic optimization model to control weed infestation by herbicide rotation**; *Elenice Stiegelmeier*, UTFPR, Brazil; *Marcos Furlan*, UFGD, Brazil; *Renan Correa*, UTFPR, Brazil; *Vilma Oliveira*, USP, Brazil; *Geraldo Silva*, UNESP, Brazil.

Control of Chaos

- P02-22: **Plasma Response In Cylindrical Tokamaks With Toroidal Effects**; *André Carlos Fraile Júnior*, IEA, Brazil; *Marisa Roberto*, ITA, Brazil; *Iberê Luiz Caldas*, USP, Brazil.

Epidemiology and Mathematical Models

- P02-23: **Analysis of spatiotemporal patterns of reported cases of AIDS and tuberculosis in the city of São Paulo by administrative districts, using bayesian disease mapping**; *Elisangela Lizzi*, UTFPR, Brazil; *Edson Martinez*, USP, Brazil; *Antonio Ruffino Neto*, USP, Brazil; *Jonathan Golub*, John Hopkins University, USA.
- P02-24: **Correlated time series using mixed models in a Bayesian perspective**; *Roberto Souza*, UTFPR, Brazil; *Jorge Achcar*, USP, Brazil; *Glaucia Bressan*, UTFPR, Brazil.
- P02-25: **Solutions for Fractional Diffusion Equations with Reaction Terms**; *Ervin Lenzi*, UEPG, Brazil; *Marcelo Kaminski Lenzi*, UFPR, Brazil; *Raphael Menechini Neto*, UEPG, Brazil.
- P02-26: **Fractional Diffusion Equation with Radial Symmetry and Reactive Boundary Conditions**; *Marcelo Kaminski Lenzi*, UFPR, Brazil; *Ervin Lenzi*, UEPG, Brazil; *Andressa Novatski*, UEPG, Brazil; *Raphael Menechini Neto*, UEPG, Brazil; *Luciano Rodrigues da Silva*, UFRN, Brazil.
- P02-27: **Regime shift in a model for vector transmitted disease epidemics**; *Romuel Machado*, UFOP, Brazil; *Everaldo Arashiro*, FURG, Brazil.

Fluidodynamics, Plasma and Turbulence

- P02-28: **Using two-dimensional continuous wavelet transform to detect differences among primary forest, water bodies, clouds and cloud shadows on remote sensing images of an Amazon rain forest region: preliminary results**; *Margarete Domingues*, INPE, Brazil; *Cledenilson Mendonça de Souza*, UFAM/CSEZ, Brazil; *Marcos Adami*, CRAINPE, Brazil; *Leonardo Deane de Abreu Sá*, CRAINPE, Brazil.
- P02-29: **Irregular dynamics of the center of mass of droplets**; *Alexandre de Almeida*, USP, Brazil; *Nicolas Giovambattista*, University of New York, USA; *Sergey Buldyrev*, Yeshiva University, USA; *Adriano Alencar*, USP, Brazil.
- P02-30: **The Non-Axisymmetric Magnetic Separatrix In Fusion Plasmas**; *D. Ciro*, USP, Brazil; *Iberê Luiz Caldas*, USP, Brazil.

Modeling, Numerical Simulation and Optimization

- P02-31: **Modelling the Air-Water Interface**; *Frank Longford*, University of Southampton, UK; *Jeremy Frey*, University of Southampton, UK; *Jonathan Essex*, University of Southampton, UK; *Chris-Kriton Skylaris*, University of Southampton, UK.
- P02-32: **Modeling smart structures to reload smartphones using linear quadratic regulator (LQR) controller and the finite element method (FEM)**; *Stefânia Knebel*, UFMT, Brazil; *Marcelo Volz*, UFMT, Brazil; *Renato Santos de Souza*, UFMT, Brazil; *Aguinaldo Soares*, UFMT, Brazil.
- P02-33: **Axiomatic Local Metric Derivatives With Mittag-Leffler Eigenfunctions for Low-Level Fractionality**; *José Weberszpil*, UFRRJ, Brazil; *José Helayel*, Centro Brasileiro de Pesquisas Fisicas, Brazil.
- P02-34: **Identification of a nonlinear beam through a stochastic model based on a Duffing oscillator**; *Luis Villani*, UNESP, Brazil; *Samuel Silva*, UNESP, Brazil; *Americo Cunha Jr*, UERJ, Brazil.
- P02-35: **Dynamic of neuronal membrane using a numerical model**; *Marina González*, IFSP, Brazil; *Mariana Pelissari Monteiro Aguiar Baroni*, IFSP, Brazil; *Marco Aurélio Santos*, IFSP, Brazil.
- P02-36: **Analysis of RR intervals time serie using second-order difference plot**; *Laurita Santos*, UNIVAP, Brazil; *Joaquim José Barroso*, ITA, Brazil; *Moacir de Godoy*, FAMERP, Brazil; *Elbert E. N. Macau*, INPE, Brazil.
- P02-37: **Assessment the change on rhythm cardiac produces by the metabolic syndrome in rats: using nonlinear methods**; *Alondra Albarado Ibañez*, Benemérita Universidad Autonoma de Puebla, Mexico; *Marcia Hiriart*, UNAM, Mexico; *Julian Torres Jacome*, Benemérita Universidad Autonoma de Puebla, Mexico.
- P02-38: **Estimation of Dynamical Phase Models for Chaotic Oscillators;** *Leandro Abreu*, IFMG, Brazil; *Luis Aguirre*, UFMG, Brazil.

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