Monday 7th Sept 2015
MS01 10:00-10:25 change in abstract:

Title: Information and observability in complex systems
Authors: **Ezequiel Bianco-Martinez (University of Aberdeen),** Murilo S. Baptista (Institute for Complex Systems and Mathematical Biology, SUPA, University of Aberdeen) and Christophe Letellier CORIA-UMR 6614 Normandie Universite, CNRS-Universite et INSA de Rouen, Campus Universitaire du Madrillet, F-76800 Saint-Etienne du Rouvray, France)
Abstract: Observability is a very useful concept for determining whether the dynamics of complicated systems can be correctly reconstructed from a single (univariate or multivariate) time series. When the governing equations of dynamical systems are high-dimensional and/or rational, analytical computations of observability coefficients produce large polynomial functions with a number of terms that become exponentially large with the dimension and the nature of the system. In order to overcome this difficulty, we introduce in this talk a symbolic observability coefficient based on a symbolic computation of the determinant of the observability matrix. The computation of such coefficients is straightforward and can be easily analytically carried out.

P01 12:00-13:30 additional poster:

Title: Escape Basins and Fractal Basin Boundaries for the Copenhagen Problem.
Author: **Sheila Crisley de Assis** and Maisa de Oliveira Terra (Instituto Tecnológico de Aeronáutica - ITA - Departamento de Matemática, São Paulo)
Abstract: The escape basins and collisional sets are investigated in detail in the planar circular restricted three-body problem for the Copenhagen case. The mathematical model describes the planar dynamics of a particle subject to the gravitational potential of two bodies P1 and P2, named primaries, that performs coplanar circular orbits around their center of mass. The mass of the third body is much smaller than that of the primaries, thus the movement of P1 and P2 is not disturbed by the third body. In the Copenhagen case, the primaries present equal masses, so the parameter mass of the mathematical model equals 0.5. The considered scattering region is located between the Lagrangian points L2 and L3. The analysis has been performed for two cases. Namely, in the first situation just the neck around the collinear Lagrangian points L1 is open, and, in the second case, all the necks around the three collinear solutions are open. Different basins are available in each case, and several energy levels are considered in order to explore this escaping dynamics. In this work, the primaries are considered as finite bodies. Five types of behavior trajectories are analysed: (i) and (ii) trajectories which collide with the mean radii established for the primaries P1 and P2; (iii) and (iv) trajectories which escape from the scattering region through L2 or L3 channels and (v) trajectories which not collide or escape from the scattering region after completing the integration time. We computed the escape/collision time and verified that the long escaping/collisional times are associated with the fractality of the basin boundaries, chaotic saddles and their stable manifolds. These analyses are fundamental in transport processes between different regions in the context of space missions and in study of natural bodies. The fractal basin boundaries observed, reveal high sensitivity to initial conditions, implying an uncertainty between escape solutions and collisional solutions to different energy levels.

The poster of **Daniel Wetzel (Carl von Ossietzky Universität Oldenburg)** also moves to this session.

Tuesday 8th Sept
CTPA 15:42-15:57 talk cancelled:

The talk of **Sandor Kovacs** is cancelled.

CTPA 14:30-14:45 Change of speaker (talk & abstract stay identical):
Chien-Yuan Chang (Georgia Institute of Technology): Experimental Route to Chaos of an External-Cavity Semiconductor Laser

Wednesday 9th Sept

MS15 10:00-12:00 change of speaker:
The talk of **Max Little** (11:00-11:25) is given by **Yordan** Raykov (Aston University).

MS16 10:00-12:00 cancellation:
The talk of **Julien Lagarde** (10:00-10:25) is cancelled.

P02 12:00-13:00 extra poster:

Title: Some local and nonlocal constants of motion in conservative and dissipative dynamics.
Author: **Gaetano Zampieri (Verona)**
Abstract: We give a recipe to generate ``nonlocal'' constants of motion for ODE Lagrangian systems and we apply the method to find useful constants of motion which permit to prove global existence and estimates of solutions to dissipative mechanical systems. We show examples where our simple recipe can be used in practice to find genuine first integrals too. Our applications are the mechanical systems with homogeneous potential of degree -2, in particular Calogero's one, and the Maxwell-Bloch system with RWA, where in particular we can separate one of the variables."

MS17 16:30-16:55 change of speaker:

The speaker of this talk changes from **Markus Bär** to **Sebastian Heidenreich**

Thursday 9th Sept 10.00-12.00
MS23 11:30-12:00
10:00-10:25: Correction of abstract
Title: On the equivalence of phase-oscillator and integrate-and-fire models:
how the coupling functions matter

Speaker Antonio Politi (University of Aberdeen, UK)
Abstract The relationship between leaky-integrate and fire models and phase-oscillators is discussed, by deriving suitable coupling functions and phase-response curves. The (non)equivalence between the two model classes is analyzed with the help of a few examples of identical as well as different oscillators. In particular, I will discuss the onset of self-consistent partial synchronization and more complex collective phenomena.

MS23 11:30-12:00 change of speaker and title

The talk "Coupling functions between brain waves: Significance of opened/closed eyes" by **Lal Hassan** will be replaced by the following talk:

Title: Characteristics of the coupled neurons due to both their intrinsic properties and types of synaptic coupling: inhibitory and excitatory
Author: **Justus Schwabedal (Max Planck Institute for the Physics of Complex Systems, Dresden, Germany)**

Abstract: Phase resetting is essential in the description of pulse-coupled oscillator networks. However, the standard theory of phase resetting is unable to describe stochastic oscillators, and thus excludes the theoretical treatment of a large class of systems. In this talk, I present a non-perturbative theory of stochastic phase resetting.

CTPNO 11:12-11:27 Change of speaker (talk & abstract stay identical):
Daeyoung Choi (Georgia Institute of Technology): Extreme events in the chaotic dynamics of external-cavity semiconductor lasers