CENTRO DE MATEMÁTICA UNIVERSIDADE DO PORTO

CMUP Post-doc Meeting

December 18, 2015 *Room M031*

Hour	Speaker	Talk
14h30	**Manuel Delgado** *Director of CMUP*	***Informations about CMUP*** Am I an integrated or associated CMUP's member? At which line/group of research do I belong? A presentation about CMUP's organization will be done and some questions may be answered.
15h00	**Enrique Vigil** *Line of Research*: Dynamical Systems *PhD*: University of Oviedo (Spain), 2015, under supervision of A. Pumariño *Research Topics*: piecewise linear maps, strange attractors and invariant measures	***Expanding Baker Maps: una nueva y sencilla familia de aplicaciones 2-D*** El mayor avance en esta investigación ha sido, hasta el momento, la definición y estudio de las aplicaciones bautizadas como *Expanding Baker Maps* (*EBMs*). Estas aplicaciones, como su propio nombre trata de explicar, reproducen el trabajo que realiza un panadero cuando amasa el pan. Así, un dominio es doblado y estirado una y otra vez hasta obtener el resultado final: magdalenas (*madalenas*), roscas de pan (*regueifas*), hogazas de pan (*pão rústico*)... En nuestro caso, este "resultado final" no es más que un atractor extraño. A pesar de su aparente sencillez, pues se trata de aplicaciones lineales a trozos definidas en $\mathbb{R}^2$, la riqueza dinámica de estas aplicaciones es muy interesante. En esta breve charla se introducirá el concepto de *Expanding Baker Map*, mostrando dónde tienen su origen, los primeros resultados obtenidos, el trabajo que se está realizando y el camino que se pretende seguir de cara al futuro.
15h40	Coffee Break	
16h05	**Marco Martins Afonso** *Line of Research*: Dynamical Systems *PhD*: University of Genova (Italy), 2006 *Post-doc positions*: Israel, USA and France (Toulouse, Montpellier and Marseille) *Invited visiting scientist*: University of Helsinki (Finland) *Research Topics*: Theoretical / Statistical physics and Turbulent / Chaotic / Nonlinear dynamics	***Renormalized Transport of Inertial Particles*** We study how an imposed flow - laminar or turbulent - modifies the transport properties of inertial particles, namely their terminal velocity, effective diffusivity, and concentration following a point-source emission. Such quantities are investigated by means of analytical and numerical computations, as functions of the control parameters of both flow and particle, i.e. density ratio, inertia, Brownian diffusivity, gravity (or other external forces), turbulence intensity, compressibility degree, space dimension, and geometric/temporal properties. The complex interplay between these parameters leads to the following conclusion of interest in the realm of applications: any attempt to model dispersion and sedimentation processes (or, equivalently, the wind-driven surface transport of floaters) cannot avoid taking into account the full details of the flow field and of the inertial particle.
16h45	**André Gama Oliveira** *Line of Research*: Geometry and Topology *PhD*: University of Porto, 2008, under supervision of P. Gothen *Teaching Positions:* UTAD, since 1999 *Research topics*: Moduli spaces, Higgs bundles and Hitchin system for Langlands dual groups	***A tiny bit of the world of Higgs bundles*** The theory of vector bundles over compact Riemann surfaces stands at the crossroads of several key areas of Mathematics and Modern Physics. Since the construction of their moduli spaces, much progress has been achieved in the description of these spaces, involving ideas from a wide variety of areas. A new chapter has begun in the late 80's with the introduction of Higgs bundles by Nigel Hitchin. The moduli spaces of Higgs bundles have, on one hand, a very rich geometric and topological structure, which is far from being fully understood. On the other hand, they play a crucial role in many different, apparently unrelated, areas, including surface group representations, hyperkähler geometry, mirror symmetry and more. In this talk we will briefly review some of these aspects, presenting some results and open problems.
17h25	Closing	

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