ISAAC 2009 – Dynamical Systems Sessions

For full program information visit conference web site http://www.isaac2009.org

TUESDAY MORNING
HUXLEY 408

9.00-9.30
Flavio Abdenur
New results on stability and genericity

9.30-10.00
Keith Burns
Partial hyperbolicity and ergodicity

10.00-10.30
Giovanni Forni
Limiting distributions for horocycle flows

TUESDAY AFTERNOON
HUXLEY 408

14.30-15.00
Giovanni Panti
Dynamical systems arising in algebraic logic

15.00-15.30
Marco Abate
Poincaré-Bendixson theorems in holomorphic dynamics

15.30-16.00
Thomas Jordan
Hausdorff dimension of projections of McMullen-Bedord carpets

16.00-16.30 BREAK

16.30-17.00
Jörg Schmeling
Large intersection properties of some invariant sets in number-theoretic dynamical systems

17.00-17.15
Chen-chang Peng
Existence of transversal homoclinic orbits for Arneodo-Coullet-Tresser map

17.15-17.30
Bau-Sen Du
On the nature of chaos

17.30-17.45
Asad Niknam
Approximately inner C*-Dynamical Systems

17.45-18.00
Svetlana Budochkina
First integrals in mechanics of infinite-dimensional systems

MONDAY AFTERNOON
HUXLEY 408

14.00-14.30
José Alves
On the liftability of absolutely continuous ergodic expanding measures

14.30-15.00
Jorge Freitas
Rates of mixing, large deviations and recurrence times.

15.00-15.30
Mike Todd
Thermodynamic formalism for unimodal maps

BREAK

16.00-16.30
Qiudong Wang
Dynamics of periodically perturbed homoclinic solutions

16.30-17.00
Pierre Berger
Abundance of one dimensional non uniformly hyperbolic attractors for surface dynamics

FRIDAY AFTERNOON
HUXLEY 658

14.30-15.00
Michael Field
Mixing for Flows and Skew Extensions

15.00-15.30
Matthew Nicol
A dynamical Borel-Cantelli lemma for a class of non-uniformly hyperbolic systems

15.30-16.00
Yi-Chiuan Chen
On Topological Entropy of Billiard Tables with Small Inner Scatterers

BREAK

16.30-17.00
Valery Gaiko
Limit Cycle Problems and Applications

17.00-17.30
Jan Cees van der Meer
Fourfold 1:1 resonance, relative equilibria and moment polytopes

17.30-18.00
Felix Sadyrbaev
Bifurcations of period annuli and solutions of nonlinear boundary value problems

18.00-18.30
Martin Rasmussen
Bifurcation of random diffeomorphisms with bounded noise

on the maximum number and relative position of their limit cycles in two special cases of such systems. First, using geometric properties of four field rotation parameters of a new canonical system, we present the proof of our earlier conjecture that the maximum number of limit cycles in a quadratic system is equal to four and their only possible distribution is $(3:1)$. Then, by means of the same geometric approach, we solve the Problem for Liénard's polynomial system (in this special case, it is considered as Smale's Thirteenth Problem). Besides, generalizing the obtained results, we present the solution of Hilbert's Sixteenth Problem on the maximum number of limit cycles surrounding a singular point for an arbitrary polynomial system and, applying the Wintner–Perko termination principle for multiple limit cycles, we develop an alternative approach to solving the Problem. By means of this approach we complete also the global qualitative analysis of a generalized Liénard cubic system, a neural network cubic system, a Liénard-type piecewise linear system and a quartic dynamical system which models the population dynamics in ecological systems.

Hausdorff dimension of Projections of McMullen-Bedford carpets

THOMAS JORDAN
Department of Mathematics, The University of Bristol, University Walk Clifton, Bristol BS8 1TW United Kingdom
Thomas.Jordan@bristol.ac.uk

Joint work with Andrew Ferguson and Pablo Shmerkin. Marstand's Projection Theorem states that If $E \subset \mathbb{R}^2$ has Hausdorff dimension less than 1 then orthogonal projections in almost all directions preserve this dimension. For general sets very little is known about exactly which directions preserve the dimension. We show that if E is a type of self-affine set investigated by Bedford and Mc-Mullen then orthogonal projections in all directions in $(0, \pi/2)$ preserve the dimension. This is an extension of a result on products of Cantors sets by Peres and Shmerkin.

Fourfold 1:1 resonance, relative equilibria and moment polytopes

JAN CEES VAN DER MEER
Dept. of Mathematics and Computer Science, Eindhoven University of Technology, Den Dolech 2, Eindhoven, N.B. 5612 AZ Netherlands
j.c.v.d.meer@tue.nl

A uniparametric 4-DOF family of perturbed Hamiltonian oscillators in 1:1:1:1 resonance, with two additional rotational symmetries, is studied. These systems generalize several models of perturbed Keplerian systems. After normalization the truncated normal form is reduced in stages to a one-degree-of-freedom system. In this reduction process moment polytopes turn up describing part of the relative equilibria for such systems.
Joint work with S. Ferrer, G. Diaz, J. Egea, J.A. Vera.

A dynamical Borel-Cantelli lemma for a class of non-uniformly hyperbolic systems

MATTHEW NICOL
Department of Mathematics University of Houston Houston, Texas 77204-3008 United States
nicol@math.uh.edu

We establish a dynamical Borel-Cantelli lemma for shrinking balls for certain classes of non-uniformly hyperbolic dynamical systems. As an application we establish results on almost sure behavior of extremes for these classes of dynamical systems.
This work is joint with Chinmaya Gupta and William Ott (both University of Surrey).

Approximately inner C^*-dynamical systems

ASAD NIKNAM
Departement of Mathematics, Ferdowsi University of Mashad, Vakilahbad Boulvar Mashad, Khorahsan 1159-91775, Iran
dassamankin@yahoo.co.uk

In quantum statistical mechanics one often describe a physical system in terms of a C^*-algebra A. The dynamics or time evoluton of the systems is given in terms of one parameter group of $*$-automophisims on A. We study such C^*-dynamical systems. We prove that under some restriction the dynamic is approximately inner. Moreover we construct a dynamical system which is not approximatelly inner and therefore without ground state.

Dynamical systems arising in algebraic logic

GIOVANNI PANTI
Department of Mathematics, via delle Scienze, 208 Udine, UD 33100 Italy
panti@dimi.uniud.it

Algebraic logic studies the algebras associated to certain logical systems. Standard examples are boolean algebras, MV-algebras, Heyting algebras, associated to classical logic, many-valued logic, intuitionistic logic, respectively. Typically, these algebras have dual spectral spaces, and can be represented as algebras of functions on the spectrum: automorphisms of the algebras correspond then to dynamical systems on the dual.
We survey here the structure of the relevant dynamical systems, the results that have been obtained and their significance, the open problems and directions for further research.

Existence of transversal homoclinic orbits for Arneodo-Coullet-Tresser map

CHEN-CHANG PENG
Department of Applied Mathematics, National Chiayi University No.300 Syuefu Rd. Chiayi City, Taiwan 60004 Taiwan
ccpeng@mail.ncyu.edu.tw

In this talk, first we study difference equations

$$x_{k+n} = F(x_{k+n-1}, \cdots, x_k, b_1 x_{k-1}, \cdots, b_m x_{k-m})$$