

# RSME-SMM-2012

# 17-20 ene 2012, Torremolinos

## S20. Sistemas Dinámicos. SALA M2

Coordinada por: **Francisco Romero**, U. Complutense Madrid; **Patricia Domínguez**, BUAP.

### PROGRAMA

- mar17 15:00-15:40** → **CARLES SIMÓ**, U. Barcelona  
*Some properties of the global behaviour of conservative low dimensional systems.*
- mar17 15:40-16:20** → **JESÚS MUCIÑO**, Centro de Ciencias Matemáticas, UNAM  
*Dinámica en sistemas hamiltonianos holomorfos.*
- mar17 16:20-17:00** → **JOSÉ MANUEL SALAZAR**, U. Alcalá  
*Asymptotic stability for orientation reversing planar homeomorphisms.*
- mar17 17:00-17:40** → **ÁLVARO ÁLVAREZ**, U. Autónoma Baja California, México  
*Geometría y dinámica cerca de singularidades esenciales.*
- mié18 15:00-15:40** → **ALBERTO VERJOVSKI**, Instituto de Matemáticas, UNAM  
*El teorema de Hedlund para laminaciones.*
- mié18 15:40-16:20** → **MÓNICA MORENO**, CIMAT, México  
*Combinatorial description of Sierpinski curve Julia sets of rational maps.*
- mié18 16:20-17:00** → **JAIME JORGE SÁNCHEZ-GABITES**, U. Castilla-La Mancha  
*Bloques aislantes regulares en 3-variedades.*
- mié18 17:00-17:40** → **ARMENGOL GASULL**, U. Autònoma Barcelona  
*The solution of the Composition Conjecture for Abel equations.*

### RESÚMENES

**Ponente:** CARLES SIMÓ U. Barcelona

**Título:** *Some properties of the global behaviour of conservative low dimensional systems*

**Hora:** (M2) mar17 15:00-15:40

**Resumen:** When faced to a system in a global way, there are few theoretical and even numerical tools to grasp, with a certain detail, all the aspects of the dynamics. A combination of analytic, symbolic and numerical tools, together with qualitative and topological considerations can give a reasonably full description.

Furthermore it is possible to derive paradigmatic models which can be analysed theoretically and allow to study different pieces of the dynamics.

It is also important to know the relevance of different phenomena. Are they confined to a narrow domain of the phase space or to a tiny region of the parameter space or do they really play a significant role?

Several theoretical and numerical tools will be presented and applied to different problems in celestial mechanics, fluid mechanics and unfolding of singularities.

This is part of a large project towards understanding finite-dimensional systems in a global way.

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**Ponente:** JESÚS MUCIÑO Centro de Ciencias Matemáticas, UNAM

**Título:** *Dinámica en sistemas hamiltonianos holomorfos*

**Hora:** (M2) mar17 15:40-16:20

**Resumen:** Es bien conocido que ciertas soluciones de problemas integrables Hamiltonianos pueden escribirse como integrales abelianas y sus funciones inversas. Exploramos la dinámica del real de la versión compleja (holomorfa) de estos sistemas.

Ellos nos llevan a considerar sus trayectorias complejas asociadas; que resultan ser superficies de Riemann, mismas que poseen estructuras planas (naturales) con un flujo geodésico real.

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**Ponente:** JOSÉ MANUEL SALAZAR

U. Alcalá

**Título:** *Asymptotic stability for orientation reversing planar homeomorphisms*

**Hora:** (M2) mar17 16:20-17:00

**Resumen:** In this talk we prove that if  $f$  is an orientation reversing planar homeomorphism and  $0$  is an isolated, as a periodic orbit, fixed point, then stability and asymptotically stability are equivalent for  $0$ . This result is a corollary of our main theorem which says that if  $f : U \subset \mathbb{R}^2 \rightarrow f(U) \subset \mathbb{R}^2$  is an orientation reversing planar homeomorphism, with  $U$  an open set and  $0 \in U$  an isolated, as a periodic orbit, fixed point with fixed point indices  $i_{\mathbb{R}^2}(f, 0) = i_{\mathbb{R}^2}(f^2, 0) = 1$ , then there exists an orientation preserving dissipative homeomorphism  $\varphi : \mathbb{R}^2 \rightarrow \mathbb{R}^2$  such that  $f^2 = \varphi$  in a small neighborhood of  $0$  and  $\{0\}$  is a global attractor for  $\varphi$ . This is a joint work with Francisco R. Ruiz del Portal

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**Ponente:** ÁLVARO ÁLVAREZ

U. Autónoma Baja California, México

**Título:** *Geometría y dinámica cerca de singularidades esenciales*

**Hora:** (M2) mar17 17:00-17:40

**Resumen:** Mostraremos avances en el estudio de la geometría y dinámica de los flujos asociados a campos vectoriales analíticos en vecindades de singularidades esenciales sobre superficies de Riemann.

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**Ponente:** ALBERTO VERJOVSKI

Instituto de Matemáticas, UNAM

**Título:** *El teorema de Hedlund para laminaciones*

**Hora:** (M2) mié18 15:00-15:40

**Resumen:** Se describirá la versión de este célebre teorema sobre la minimalidad del flujo horocíclico en el fibrado tangente unitario de una superficie hiperbólica para el caso de una laminación compacta por superficies hiperbólicas.

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**Ponente:** MÓNICA MORENO

CIMAT, México

**Título:** *Combinatorial description of Sierpinski curve Julia sets of rational maps*

**Hora:** (M2) mié18 15:40-16:20

**Resumen:** A certain class of rational maps acting on the Riemann sphere are known to have Julia sets homeomorphic to the Sierpinski curve continuum. These rational maps have critical orbits that eventually enter the immediate basin of the point at infinity after a positive number of iterations.

If two rational maps whose critical orbits enter the basin with the same number of iterations, they happen to be topologically conjugate if and only if they are Möbius or anti-Möbius conjugate (Devaney & Pilgrim, 2009). In this talk we present a combinatorial description of rational maps with Sierpinski curve Julia sets. This description characterizes conjugacy classes and provides an abstract model for hyperbolic components in parameter plane.

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**Ponente:** JAIME JORGE SÁNCHEZ-GABITES

U. Castilla-La Mancha

**Título:** *Bloques aislantes regulares en 3-variedades*

**Hora:** (M2) mié18 16:20-17:00

**Resumen:** Consideramos compactos invariantes aislados  $K$  (en el sentido de Conley) para flujos de 3-variedades, e introducimos para ellos la noción de bloque aislante regular. Estos son bloques aislantes  $N$  con la propiedad de que la inclusión de  $K$  en  $N$  induce isomorfismos en cohomología de Čech. Los bloques aislantes regulares existen y son únicos salvo isotopía ambiente. Además, son "minimales" en el sentido de que cualquier otro bloque aislante se puede construir a partir de uno regular agregándole asas. Utilizaremos estos resultados para explorar la cohomología de compactos invariantes aislados de  $\mathbb{R}^3$  en términos de elementos explícitamente computables a partir del flujo.

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**Ponente:** ARMENGOL GASULL

U. Autònoma Barcelona

**Título:** *The solution of the Composition Conjecture for Abel equations*

**Hora:** (M2) mié18 17:00-17:40

**Resumen:** Trigonometric Abel differential equations appear in a natural way when one studies the number of limit cycles and the center-focus problem for certain families of planar polynomial systems. Inside trigonometric Abel equations there is a class of centers, the composition centers, that are widely studied during this last years. We fully characterize this type of centers. They are given for the couples of trigonometric polynomials for which all the generalized moments vanish and also coincide with the strongly persistent centers. This result solves the so called "Composition Conjecture" for trigonometric Abel differential equations. This talk is based on a joint work with Anna Cima and Francesc Mañosas.

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