

Announcement of the second

JORNADES D'INTRODUCCIÓ ALS SISTEMES DINÀMICS (JISD2003)

Barcelona, June 23-28, 2003

The second edition of the *JORNADES D'INTRODUCCIÓ ALS SISTEMES DINÀMICS (JISD2003)*, will be held during June 23-28 2003 at the [Universitat Politècnica de Catalunya \(UPC\)](http://www.upc.edu), in Barcelona.

The **JISD2003** will be devoted to the two courses

- Qualitative and Quantitative Methods in Dynamical Systems (48034), by Rafael de la Llave
- Asymptotic Methods In Dynamical Systems (48114), by George Haller

of the Doctoral Programme in [Applied Mathematics](#), inside the [Graduate studies at UPC](#), under the supervision of Prof. [Tere M. Seara](#), coordinator of the section of Dynamical Systems and Control of the Programme. The courses will be given from June 23 to June 28, and will consist on 5 hours lectures every day, except for June 24.

The **JISD2003**, as well as the Doctoral Programme in Applied Mathematics, is supported by a Spanish grant [Ayuda para favorecer la movilidad de profesorado universitario](#).

Objective

The courses will deal with the *Theory and Applications of Normally Hyperbolic Invariant Manifolds*, and will be delivered by [Prof. Rafael de la Llave \(U. Texas\)](#) and [Prof. George Haller \(MIT\)](#), respectively. The abstract of these courses is

Nonlinear physical systems often display complicated yet robust patterns in their behavior. These patterns can usually be viewed as invariant manifolds in the phase space of the corresponding dynamical system. Surveyed in this course, invariant manifold theory offers a way to characterize, predict, and control complicated patterns of nonlinear behavior. Beyond reviewing the basics of the theory, we shall survey applications to physical problems of current interest.

The **JISD2003** will consist of two parts: *An Introduction to the theory of normally hyperbolic manifolds*, and *Some applications of this theory*.

1. Introduction to the theory of normally hyperbolic manifolds
 - Infinitesimal theory:
 - Exponential dichotomies.
 - Invariant subbundles.
 - The invariant section theorem.
 - Cohomology equations.
 - Persistence of locally invariant manifolds.
 - Persistence of locally invariant laminations and foliations.
2. Invariant manifolds in physical systems.
 - Finite-dimensional applications:
 - Turbulent fluid mixing.
 - Unsteady separation.
 - Flow control.
 - Infinite-dimensional applications:
 - Nonlinear optics (Schrodinger and Maxwell-Bloch equations).
 - Diffusive tracer dynamics (advection-diffusion equation).

Schedule

Monday June 23	09.00 - 11.00	Introduction to the theory of normally hyperbolic manifolds (R. de la LLave)
	11.00 - 11.30	Cofee break
	11.30 - 13.30	Introduction to the theory of normally hyperbolic manifolds (R. de la LLave)
Wednesday June 25	09.00 - 11.00	Introduction to the theory of normally hyperbolic manifolds (R. de la LLave)
	11.00 - 11.30	Cofee break
	11.30 - 13.30	Invariant manifolds in physical systems (G. Haller).
Thursday June 26	09.00 - 11.00	Introduction to the theory of normally hyperbolic manifolds (R. de la LLave)
	11.00 - 11.30	Cofee break
	11.30 - 13.30	Invariant manifolds in physical systems (G. Haller).
Friday June 27	09.00 - 11.00	Introduction to the theory of normally hyperbolic manifolds (R. de la LLave)
	11.00 - 11.30	Cofee break
	11.30 - 13.30	Invariant manifolds in physical systems (G. Haller).
Saturday June 28	09.00 - 11.00	Invariant manifolds in physical systems (G. Haller).
	11.00 - 11.30	Cofee break
	11.30 - 13.30	Invariant manifolds in physical systems (G. Haller).

(*) All the courses will be held in the room n.003 of the FME building (Facultat de MAtematiques i Estadística), at C/ Pau Gargallo, n. 5 Barcelona, 08028.

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