

## Irregular motion and global instability in Hamiltonian systems

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### Abstract

I will describe two different settings where geometrical methods can be applied to detect (global) instability in mechanical systems: a priori chaotic and a priori unstable Hamiltonian systems. A very wide class of geodesic flows in any dimension plus a quasi-periodic perturbation, as well as the Elliptic Restricted Three Body Problem (ERTBP) give rise to a priori chaotic Hamiltonian system, whereas a priori unstable Hamiltonian systems take place in considering periodic perturbations of a (or some) pendulum plus a (or some) rotor.

In both cases, there is a very big invariant object called NHIM (normally hyperbolic invariant manifold), which apart from its inner dynamics, possesses an outer dynamics, due to the transversal intersection of its associated unstable and stable invariant manifolds, which is described by the so called scattering map.

The combination of both dynamics along the NHIM gives rise to chaotic and unstable global behavior.

This talk is based on joint work with several collaborators: Rafael de la Llave, Tere M. Seara, Gemma Hugué, Elisabet Canalias, Marian Gidea, Vadim Kaloshin, Josep Masdemont, Pau Roldán, Abraham de la Rosa . . .

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