The scattering map in the Restricted Three Body Problem

A. Delshams[1]   J.J. Masdemont[1]   P. Roldán[1]

1 Departament de Matemàtica Aplicada I. Universitat Politècnica de Catalunya. Avda. Diagonal 647, 08028 Barcelona (Spain).

Abstract

The scattering map is a tool to describe the dynamics homoclinic to a normally hyperbolic invariant manifold Λ. Heuristically, it relates points in Λ through homoclinic trajectories to Λ.

The scattering map was introduced in [1], and used in [2] as an important device to prove the existence of diffusion trajectories for a certain class of a priori unstable Hamiltonian systems. In [3] we studied the scattering map for the planar Restricted Three Body Problem, defined on the center manifold around a collinear equilibrium point. In the talk, we will discuss the computation of the scattering map for the spatial Restricted Three Body Problem, and some possible applications to astrodynamics.

References

[1] A. Delshams, R. de la Llave and T. Seara. A geometric approach to the existence of orbits with unbounded energy in generic periodic perturbations by a potential of generic geodesic flows of $\mathbb{T}^2$. *Comm. Math. Phys.*, 209(2):353–392, 2000.

[2] A. Delshams, R. de la Llave and T. Seara. A geometric mechanism for diffusion in Hamiltonian systems overcoming the large gap problem: heuristics and rigorous verification on a model. *Mem. Amer. Math. Soc.*, 179(844):1–141, 2006.

[3] E. Canalias, A. Delshams, J.J. Masdemont, P. Roldán. The scattering map in the planar Restricted Three Body Problem. *To appear in Celestial Mech. Dynam. Astronom.*