



Seminario di Analisi Matematica

lunedì 2 marzo 2026, ore 15:00
Dipartimento di Matematica e Fisica
Aula M1, edificio aule, L.go S.L. Murialdo 1

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Quasi-periodic co-orbital motions in the planetary three-body problem

Abstract

Numerous orbits exist in the solar system or in astrodynamics with very peculiar motions. Their common feature is that they consist of two moons or satellites around a central attractor which are in co-orbital motions with almost equal semi major axes. In spite of analytical theories and numerical investigations developed to describe their long-term dynamics, so far very few rigorous long-time stability results in this setting have been obtained even in the restricted three-body problem.

Actually, the nearly equal semi major axes of the moons implies also nearly equal orbital periods (or 1:1 mean motion resonance), and this last point prevents the application of the usual Hamiltonian perturbation theory for the three body problem.

Adapting the idea of Arnol'd to a resonant case, hence by an application of KAM theory to the planar three-body problem, we provide a rigorous proof of existence of a large measure set of Lagrangian invariant tori supporting quasi-periodic co-orbital motions, hence stable over infinite times.

In collaboration with L. Biasco, L. Chierchia, A. Pousse, P. Robutel.