Author: S. MARÒ
Instituto de Ciencias Matemáticas – Madrid (Spain)

Title: *"Long term dynamics in mean motion resonances with crossing singularities"*

Abstract. We consider the long term dynamics of the restricted N body problem, modeling the dynamics of an asteroid moving in the gravitational field of the Solar system. In particular we deal with the case of a mean motion resonance with a planet. The asteroid evolution is computed by averaging over the fast angles using standard techniques of perturbation theory. We focus on the critical case where the trajectory of the asteroid crosses the one of a planet during the evolution. This produces a singularity in the averaged equations of motion. We prove that the averaged vector field can be extended to two Lipschitz continuous vector fields in a neighborhood of crossing configurations and we define generalized solutions, going beyond this singularity. Moreover, we prove that the orbit distance between the asteroid and a planet is differentiable also in case of crossings. Some applications will be given considering mean motion resonances with Jupiter and crossing with the Earth. This work extends the results in (Gronchi-Tardioli 2013) to the resonant case.

Joint work with G. Gronchi.