Section 08: Ordinary Differential Equations and Dynamical Systems | Poster number 478

The Halo family of 2D tori around L_2 in the Quasi-bicircular problem

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ABSTRACT

The Quasi-bicircular problem (QBCP) is a restricted four body problem where three masses are revolving in a quasi-bicircular motion, the fourth mass being small and not influencing the motion of the primaries. Quasi-bicircular motion means that the three primaries, P_1, P_2, P_3, are moving according to the Newton's law and if $P_{2,3}$, $P_{1,2,3}$ are the corresponding centers of masses, P_2 and P_3 around $P_{2,3}$, and P_1 and $P_{2,3}$ around $P_{1,2,3}$, are moving close to a circle. The case considered corresponds to Sun, Earth, Moon and spacecraft. The motion of the fourth mass is governed by a Hamiltonian system with three degrees of freedom and depending periodically on time. This model has shown to be useful for the study of the neighbourhood of the libration point L_2 of the Earth-Moon system inside the Solar system (see [1]).

The Halo family of 2D invariant tori around L_2 in the QBCP has been studied. For this purpose, a general method for the numerical computation of invariant tori has been used (see [2]). The Halo family is a Cantor set of 2D invariant tori. It has been shown that this family has several big gaps related to resonances.

References

[1] M.A. Andreu, *The Quasi-bicircular Problem*, Thesis, Dept. Matemàtica Aplicada i Anàlisi, Universitat de Barcelona, 1999.

[2] E. Castellà, À. Jorba, "On the vertical families of two-dimensional tori near the triangular points of the Bicircular problem", Celestial Mechanics (2000, to appear).

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