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On lower dimensional tori in a restricted four body problem

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ABSTRACT

Here we introduce a model to study the dynamics of a small particle near the triangular points of the Earth-Moon system. This model is written as a quasi-periodic time dependent perturbation of the well known Restricted Three Body Problem (RTBP), and it takes into account the presence of the Sun, and the eccentricity and inclination of the Moon. This is an analytical model that has been obtained by prescribing the motion of Earth, Moon and Sun.

We will use these models to try to determine the existence of quasi-periodic solutions in an extended neighbourhood of the triangular points. To this end, we will develop and implement specific numerical methods to compute two and three dimensional invariant tori for this problem. Then, by means of a continuation method, we will obtain some families of lower dimensional tori in this zone. As we will see, these families allows to describe some aspects of the dynamics. For instance, some of these tori are normally elliptic so they are surrounded by a region of effective stability. Due to the amount of computations needed, we will also discuss the implementation of these methods on parallel computers.

Keywords: *Lagrangian points, quasi-periodic orbits, Bicircular problem*

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