Convex Central Configurations of Two Twisted n-gons

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1 Introduction

The simplest motions that can be found in the Newtonian N-body problem are the ones whose configuration is constant up to rotations and scaling, and every body follows a trajectory being a keplerian orbit. Such kind of solutions are called *central configurations*.

We consider the planar $2n$-body problem, where the masses are located at the vertices of two regular n-gons, $n \geq 2$, and all the masses at the same n-gon are equal, namely m_1 and m_2. In [4], Moeckel and Simó consider the case of two *nested* regular n-gons, that is, when the vertices of the two n-gons are aligned. They prove that for all values of n and every ratio m_1/m_2, there are exactly two planar central configurations. In [2], Barrabés et al. study the case of two *twisted* n-gons, where one of the two gons is rotated an angle of π/n with respect the other. In that case, the authors prove that the number of central configurations depends on n.

Several authors have studied the convex central configurations in the four body problem. A classical result due to MacMillan and Bartky [3] states that, for any four positive masses and any assigned order, there exists a convex planar central configuration. Xia [7] gives a simple proof of that case. Albouy et al. [1] prove that in the planar four-body problem, a convex central configuration is symmetric with respect to one diagonal if and only if the masses of the two particles on the other

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