

A family of symmetric central configurations

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We prove the existence of a highly symmetric family of central configurations (c.c.) in which 16 non negative masses move in concentric circular motions in $p = 3$ circles of radii a_1, a_2, a_3 . On the first circle, there are 4 bodies of equal masses in a square configuration. On the second circle there are also 4 bodies of equal masses, each of which located on the bisectrix lines of each pair of the position vectors of two consecutive bodies of the first circle. On the third circle, there are 8 bodies of equal masses, each of which located on the bisectrix lines of each pair of position vectors of two consecutive bodies of the previous two circles. We study the inverse problem, i.e., given 3 positive radii a_1, a_2, a_3 we determine the values of the corresponding non negative masses m_1, m_2 and m_3 , for which the above described central configuration exists. We present some particular interesting cases and study some geometrical features of such c.c.'s. We present several lines of possible further generalizations.

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