

On the central configurations in the spatial 5-body problem with four equal masses

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Abstract We analyze the families of central configurations of the spatial 5-body problem with four masses equal to 1 when the fifth mass m varies from 0 to $+\infty$. In particular we continue numerically, taking m as a parameter, the central configurations (which all are symmetric) of the restricted spatial $(4 + 1)$ -body problem with four equal masses and $m = 0$ to the spatial 5-body problem with equal masses (i.e. $m = 1$), and viceversa we continue the symmetric central configurations of the spatial 5-body problem with five equal masses to the restricted $(4 + 1)$ -body problem with four equal masses. Additionally we continue numerically the symmetric central configurations of the spatial 5-body problem with four equal masses starting with $m = 1$ and ending in $m = +\infty$, improving the results of Alvarez-Ramírez et al. (Discrete Contin Dyn Syst Ser S 1: 505–518, 2008). We find four bifurcation values of m where the number of central configuration changes. We note that the central configurations of all continued families varying m from 0 to $+\infty$ are symmetric.

Keywords Spatial central configurations · 5-Body problem · Bifurcations

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