

Hip-hop solutions of the $2N$ -body problem

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Abstract Hip-hop solutions of the $2N$ -body problem with equal masses are shown to exist using an analytic continuation argument. These solutions are close to planar regular $2N$ -gon relative equilibria with small vertical oscillations. For fixed N , an infinity of these solutions are three-dimensional choreographies, with all the bodies moving along the same closed curve in the inertial frame.

Keywords N -body problem · Analytic continuation · Hip-hop · Choreographies

1 Introduction

The equal-mass n -body problem has recently attracted much attention thanks to the work of Chenciner and other authors on the type of orbits called hip-hop solutions, and on the solutions that have eventually been called choreographies.

In a hip-hop solution, $2N$ bodies of equal mass stay for all time in the vertices of a regular rotating anti-prism whose basis, i.e. the regular polygons that define it, perform an oscillatory motion separating, reaching a maximum distance, approaching,

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