Numerical solution of restricted n-body problems, using the central differences approximation.

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Abstract

In order to simulate the trajectories of celestial bodies, we want a numerical solution to the n-body problem created by the modeling of the gravitational interactions between each body.

We want to be able to simulate these trajectories for a space scale with the same order of magnitude as the solar system, and a time scale varying from a few days to a few years.

We use a simple finite difference method on a discrete time scale to approximate the second order derivative component in the formulation of Newton's second law. No consideration has been given to the collision case.

Instead of focusing on precision or accuracy, the main goal of the study is the ease of implementation. Therefore we only study here the stability and convergence of the solution.

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