

A new point of view about a biparametric family of anomalies in the elliptic motion

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Abstract

One of the main problems in celestial mechanics is the well known two-body problem. This problem can be studied by analytical and numerical methods. In the elliptical case, the performance of the numerical method is good if the eccentricity value is not high. The main problem in this case is the distribution of the points over the orbit. Given a fixed temporal step size, most of the points are located in the apoapsis region, while few of them are in the periapsis region. This paper tries to define a new temporal variable so that the point distribution is higher over the periapsis region than on the apoapsis region. It is also desirable to obtain a higher concentration of points where the curvature is greater. To this aim, we intend to study a modification of the biparametric family of anomalies [1] that improves the distribution of points over the orbit, bringing it close to the desired distribution.

References

- [1] LÓPEZ J.A., AGOST V., BARREDA M. A new bi-parametric family of temporal transformations to improve the integration algorithms in the study of the orbital motion *J. Comput. Appl. Math.* **318**, pp. 479-490, 2017.