

**Modeling orbital dynamics around irregular elongated asteroids****Authors:**

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**Abstract:** This work studies the dynamics of non-uniform elongated asteroids through two approaches. The first one, the dipole-segment model, consist of a massive segment joined to point masses at its extrema. In the second one, the asteroid is modeled as a segment with variable linear density. The qualitative behaviour of the periodic orbits is studied using numerical techniques for both models. Several families of periodic orbits have been found through continuation of planar orbits and out-of-plane bifurcation processes, obtaining results in agreement with previous studies about the dynamics around irregular asteroids. This highlights the relevance of simple mathematical models in studying asteroid dynamics and the importance of accounting for density and geometric properties. Although the families of periodic orbits studied in this work are not comprehensively sampled, they constitute an example of the variety of orbits that can be followed by a particle orbiting the asteroid, helping us to better understand the dynamics around these elongated bodies.

**References:**

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