

## The Plutonian Moons and its dynamics

### Authors:

- Marc Jorba-Cuscó, Universitat Politècnica de Catalunya ([marc.jorba@upc.edu](mailto:marc.jorba@upc.edu))
- Daniel Pérez-Palau, Universitat Politècnica de Catalunya ([daniel.perez.palau@upc.edu](mailto:daniel.perez.palau@upc.edu))

### Abstract:

The former planet Pluto has five main moons. Charon, the biggest of the moons has a considerable mass compared with the planetoid (approximately one tenth). In addition, it rotates in an almost circular orbit around Pluto. The other four moons (Nix, Styx, Cerberus and Hydra) rotate in the Charon's orbital plane. However, [1] provided numerical evidences of the non-keplerian motion of the small moons. Due to the properties of the system, i.e. the coplanarity of all the bodies and the circular motion of the primary objects, the Circular Restricted Three Body Problem (CR3BP) is a good model. The mass ration between the primaries is high enough to be above the Routh's  $\mu$ . Therefore, the equilateral fixed points are no longer fixed.

In this talk, we will revisit previous results on the motion of the smaller moons and present a suitable family of periodic orbits in the CR3BP which mimics the position of the moons. We will analyse the stability of this family of periodic orbits and discuss whether it enables a possible transport from the primaries to the smaller moons.

### References:

- [1] J. M. Y. Woo and M. H. Lee. A numerical method for determining the elements of circumbinary orbits and its application to circumbinary planets and the satellites of pluto-charon. *The Astronomical Journal*, 159:277, 5 2020.