EPSC Abstracts
Vol. 6, EPSC-DPS2011-904, 2011
EPSC-DPS Joint Meeting 2011

On the rotation of the Trojan satellites of Saturn

P. Robutel (1), N. Rambaux (1,2), and M. El Moutamid (1,3)
(1) IMCCE, Observatoire de Paris, CNRS UMR 8028
(2) Université Pierre et Marie Curie, UPMC
(3) LESIA, Observatoire de Paris, CNRS UMR 8109
(Philippe.Robutel@imcce.fr)

Abstract

The images of Saturn's satellites Janus and Epimetheus obtained by the Cassini spacecraft provide data on their rotational behavior and stimulate the elaboration of physical librations models [1,2,3]. During its journey in the Saturnian system, Cassini spacecraft accumulates the observational data and it will be possible to determine the rotational parameters of several satellites. Here, we focus on co-orbital (Trojan) satellites Telesto, Calypso, Helene and Polydeuces, in addition to Janus and Epimetheus. Indeed, Telesto and Calypso orbit around the L_4 and L_5 Lagrange points of Saturn-Tethys while Helene and Polydeuces are co-orbitals of Dione. The goal of this study is to understand how the departure from the Keplerian motion induced by the perturbations of the co-orbital body influence the rotation of these satellites. To this aim, we generalize the analytical methods describing the rotational motion of Janus and Epimetheus [3] and apply them to the co-orbitals of Tethys and Dione.

References

[1] Tiscareno, M. S., Thomas, P. C., and Burns, J. A. (2009). The rotation of Janus and Epimetheus. Icarus, 204:254–261.

[2] Noyelles, B. (2010). Theory of the rotation of Janus and Epimetheus. Icarus, 207:887–902

[3] Robutel, P., Rambaux N., Castillo-Rogez, J. (2011). Analytical description of physical librations of saturnian coorbital satellites Janus and Epimetheus. Icarus, 211:, 204:758-769.