ANALYTICAL AND NUMERICAL STUDY OF LONG-TERM DYNAMICS FOR TROJAN-TYPE ASTEROIDS

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We aim to revisit the Trojan problem, i.e. the study of the long-term dynamical behavior of small bodies trapped in a 1/1 mean-motion commensurability with a planet of the Solar System. In the frame of the spatial and elliptic restricted three-body problem, we evolved semi-analytical expressions of the coorbital Hamiltonian and its derivatives, such a way they are non-singular whatever the values of the eccentricities and the inclinations. This new formalism is applied to locate the main secular resonances inside the coorbital regime and to investigate their dynamical effects by means of semi-numerical perturbative methods. This analysis allows us to discuss under a new light the problem of the existence of the Trojan-type objects with each planet of the Solar System.