Lidov-Kozai mechanism in 3:2 and 1:1 resonances

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Abstract. In this paper the Lidov-Kozai mechanism was studied in 3:2 and 1:1 resonances. For this aim, asteroids in the region of the Hilda group and Jupiter Trojans were considered. These populations of asteroids move in corresponding mean motion resonances with Jupiter. The study was carried out using numerical integration of real asteroids' equations of motion. A simplified dynamical model was adopted. Perturbations from only Jupiter moving in a fixed elliptical orbit were taken into account. Classical secular perturbations were excluded from osculating elements at every print step and derived orbital inclinations and eccentricities were plotted versus a perihelion argument ω. As a result, it was found that usual positions of an eccentricity maximum and, accordingly, an inclination minimum ($\omega = 90^{o}$, 270°) are shifted in these resonant regions. For Hildas the maximum of the eccentricity is achieved with perihelion argument values $\omega = 0^{o}$, 180°. For L4 Trojans it is achieved with $\omega = 30^{o}$, 210°, and for L5 Trojans - with $\omega = 150^{o}$, 330°.

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