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Study on the Lagrangian Points and Gravitational Perturbations Using Astronomical Dynamics and Computer Analysis RICHARD KYUNG, IVY LIANG, CRG-NJ — In celestial mechanics, the Lagrangian points are located by the physical and geometrical properties of the two large orbiting bodies. In this research, asteroids trapped in L4 and L5 locations on the orbits of planets were observed and analyzed to determine whether the Trojan asteroids maintain or deviate their positions in relation to the two large rotating bodies. Lagrange points, stabilities, and the motions around such points were studied for the three-body problem in astronomical mechanics. Furthermore, based on the equations of motion, including the accelerations and velocities of the planets and asteroids around Lagrange points, simulations of the orbit of the Trojan asteroids system were performed using computer analysis. The 2D and 3D displays were obtained in either inertial frame or rotating frame. Modifications of the parameters and initialization were altered to create comparisons between the outputs of trajectories for different cases.

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