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Evolution of Asteroid Orbits in a Restricted Three-Body Problem Simulation DAVID W. KRAFT, University of Bridgeport — We study the evolution of asteroid orbits in a restricted three-body problem formulation consisting of the Sun, the planet Jupiter and an unspecified asteroid of negligible mass. It was discovered by Kirkwood [1] that the distribution of asteroid orbits contains gaps for orbits whose period is commensurate with that of Jupiter. Detailed computations in three-dimensional, many-body formulations found that test bodies initially placed in a forbidden orbit did not develop large eccentricities or leave the gap even after the passage of 10^5 years [2]. In the present two-dimensional simulation, an extension of earlier work [3], we perform numerical integrations of the coupled equations of motion for Jupiter and the asteroid. Under assumptions of a stationary Sun and a circular orbit for Jupiter, we find that test bodies initially placed in a forbidden orbit can develop a large eccentricity after relatively few orbits.

1. Daniel Kirkwood, Proceedings of the American Association for the Advancement of Science for 1866, pp. 8-14 (1866).
2. See, for example, J. Wisdom, Astronomical Journal, 87, 577 (1982).
3. David W. Kraft, Bulletin of the American Physical Society, 33, 64 (1988).

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