

Assignment 2

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Abstract

A N-body simulation code uses position, astronomical units (AU), and velocity, astronomical units per day (AU/day), initial conditions to explore various celestial mechanic physics. The units used in the initial conditions are consistent throughout the explorations unless stated otherwise. A 2-body simulation observes the conservation of angular momentum and energy of a Sun-Jupiter system from April 8, 1988 to April 8, 2014. The motion for a stable 3-body system of equal masses is observed through a time frame of 365 days. Also, the placement of various planetary masses between Jupiter and Mars shows that our Solar System's orbital motions can be affected by masses larger than 10^{-3} and remain stable with masses magnitudes smaller. Finally, a binary star system's energy and motion are observed. We observe the effects that initial velocity has on the motion of the binary star system's motion.