LENNARD BAKKER, Brigham Young University

Periodic SBC Orbits in the Planar Pairwise Symmetric Problem

We prove the analytic existence of a symmetric periodic simultaneous binary collision orbit in a regularized planar pairwise symmetric equal mass four-body problem. We provide some analytic and numerical evidence for this periodic orbit to be linearly stable. We then use a continuation method to numerically find symmetric periodic simultaneous binary collision orbits in a regularized planar pairwise symmetric 1, m, 1, m four-body problem for m between 0 and 1. We numerically investigate the linear stability of these periodic orbits through long-term integration of the regularized equations, showing that linear stability occurs when $0.538 \leq m \leq 1$, and instability occurs when $0 < m \leq 0.537$ with spectral stability for $m \approx 0.537$.