

Abstract Submitted
for the TSS10 Meeting of
The American Physical Society

Quantifying Chaos in the Three Body Problem BILLY QUARLES,
ZDZISLAW MUSIELAK, University of Texas at Arlington — The Circular Restricted 3-Body Problem (CR3BP) has been studied for many years. Classically it has been shown to potentially lead to chaos. However, instability and chaos are not synonymous. In exploring numerically the orbits in the CR3BP, we seek to establish criteria by determining which initial conditions will produce stable or chaotic orbits. By using the method of Lyapunov exponents we can quantify which orbits are chaotic. This project looks to explore this area by using student developed Java programs to perform the numerical integrations of the orbits as well as Lyapunov exponent determination. Additionally, we have developed software to visually show the orbit of the 3rd smaller from different reference points. By finding long term stable orbits in the CR3BP, we may be able to predict more exotic extra-solar planetary orbital configurations than what has already been observationally established.

Billy Quarles
University of Texas at Arlington

Date submitted: 22 Feb 2010

Electronic form version 1.4