

Outline - APPM 5460 Proposal

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0.1 needs

- 2-4 pages
- Lit review
- dynamical system modeled by ordinary differential equations
- material from class

0.2 outline

- Intro
 - In this proposal, we will be investigating homoclinic orbits in the Circular Restricted Three-Body Problem
 - (tie to competition history)
 - Homoclinic orbits are ...
 - They are important because ...
- History / Lit Review
 - Competition basics ... 4 problems
 - 1st problem was n-body problem
 - Poincare went for 3-body since it was the first unsolved... settled for CR3BP
 - (description of CR3BP)
 - $\ddot{x} = 2\dot{y} + x + \left(\frac{1-\mu}{r_1^3} - \frac{3R_1^2 J_{2,1}(1-\mu)}{2r_1^7} (5z^2 - r_1^2) \right) (x_1 - x) + \left(\frac{\mu}{r_2^3} - \frac{3\mu R_2^2 J_{2,2}}{2r_2^7} (5z^2 - r_2^2) \right) (x_2 - x)$
 - $\ddot{y} = -2\dot{x} + y \left(-\frac{1-\mu}{r_1^3} - \frac{\mu}{r_2^3} + \frac{3R_1^2 J_{2,1}(1-\mu)}{2r_1^7} (5z^2 - r_1^2) + \frac{3\mu R_2^2 J_{2,2}}{2r_2^7} (5z^2 - r_2^2) + 1 \right)$
 - $\ddot{z} = z \left(-\frac{1-\mu}{r_1^3} - \frac{\mu}{r_2^3} + \frac{3R_1^2 J_{2,1}(1-\mu)}{2r_1^7} (5z^2 - 3r_1^2) + \frac{3\mu R_2^2 J_{2,2}}{2r_2^7} (5z^2 - 3r_2^2) \right)$

- (a bit on the error ... discuss the math)
 - as a result, found homoclinic points/orbits
- Application
 - Much research has been conducted in this field since (references, references, references)
 - (pg 72+ of book)
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