

Homework 10

Math 469 (section 500), Spring 2016

This homework is due on Thursday, March 31.

0. Read Sections 4.7–4.8

1. Use the Routh-Hurwitz criterion to find conditions on $b \in \mathbb{R}$ so that all solutions of the following differential equation approach zero:

$$\frac{d^3x}{dt^3} + b\frac{d^2x}{dt^2} + \frac{dx}{dt} + 2x = 0 .$$

2. Section 4.12 #13–15

3. (This part of your homework pertains to your final project.) *This week, you will critique another student's draft. Staple your comments to the draft, and make sure both your name and the authors' names appear on the front. Do not staple this to the rest of your homework.*

(a) Read through the draft. Mark each spot you got confused.

(b) What questions do you have for the authors?

(c) Is each of the three required sections (introduction, background, results) adequate?

(d) What aspects of the draft did you like?

(e) What could the authors do to improve their draft?

4. If you have any academic conflicts with the proposed schedule for presentations (on the back), contact the instructor know by Thursday, March 31.

Tentative schedule for presentations

1. Thursday, April 14

- *A mathematical model of sickle cell genome frequency in response to selective pressure from malaria* (Liddell et al. 2014)
- *Evolutionary Entropy: A Predictor of Body Size, Metabolic Rate and Maximal Life Span* (Demetrius et al. 2009)
- *Average probability that a “cold hit” in a DNA database search results in an erroneous attribution.* (Song et al. 2009)

2. Tuesday, April 19

- *Unlimited multistability and Boolean logic in microbial signalling* (Kothamachu et al. 2015)
- *The Dynamics of HPV Infection and Cervical Cancer Cells* (Asih et al. 2016)
- *Dynamics of HIV infection in lymphoid tissue network* (Nakaoka et al. 2015)

3. Thursday, April 21

- *Estimating Tumor Growth Rates In Vivo* (Talkington et al. 2015)
- *A mathematical model of tumor-immune evasion and siRNA treatment* (Arciero et al. 2004)

4. Tuesday, April 26

- *Clique topology reveals intrinsic geometric structure in neural correlations* (Giusti et al. 2015)
- *On the nature of seizure dynamics* (Jirsa et al. 2014)

5. Thursday, April 28

- *Modelling American trypanosomiasis in an endemic zone: application to the initial spread of household infection in the Argentine Chaco* (Fabrizio et al. 2014)
- *The Inverse Method for a Childhood Infectious Disease Model with Its Application to Pre-vaccination and Post-vaccination Measles Data* (Kong et al. 2015)
- *Modeling of secondary treated wastewater disinfection by UV irradiation: effects of suspended solids content* (Brahmi et al. 2010)