

CS341 SYSTEMS BIOLOGY I

HOMEWORK ASSIGNMENT #3 – READING AND CODING (TUES SEPT 19, 2017)

1. CODING

The purpose of this assignment is to familiarize yourself with the Matlab code Stephanie wrote in class on Thursday. It is available on the web (<http://www.cs.colby.edu/courses/F17/cs341/homeworks/dimerization.zip>). Download, unzip it, run it, and ask me a question about some aspect of the code that you don't understand. (and yes, your questions will remain anonymous).

2. READING

The goal of this reading assignment is to provide a more detailed description of the process of modeling gene regulatory networks.

Read “Modeling transcriptional regulatory networks” by H Bolouri and EH Davidson, BioEssays, 2002 (emailed by Stephanie)

- (1) Briefly describe the different types of modeling formalisms.
- (2) What is the process of developing an ODE model for a gene regulatory network?
- (3) The authors emphasize that the uniqueness of each a large GRN (i.e. what makes one network accomplish task A and another different network accomplish task B) is at the highest level of organization. A large network is composed, in a unique way, of “standard” building blocks. There are only a few types of building blocks. Describe each of them.
- (4) For many systems, the network structure seems to be more important than the rate parameters. Why?