

CS341 SYSTEMS BIOLOGY I

HOMEWORK ASSIGNMENT #5 – READING (THURS SEPTEMBER 27, 2017)

1. READING

The goal of this reading assignment is to provide a more detailed discussion of the Hill equation as used to model gene regulation.

Read sections 2.1 through 2.3.4 (inclusive) and section 2.4 (but not 2.4.1) of the handout Stephanie emailed.

- (1) The Hill function can be steep or gradual. What determines its steepness? Why would it make sense to use a logic approximation?
- (2) What is “response time”? Where have we seen this before?
- (3) At first, when we associate the word “scale” with a model, we may think of scale in terms of size. Some models deal with very small elements (e.g. we could model the process of transcription with lots of detail, including representing each code), some larger (e.g. each protein is represented), and some much larger (e.g. each organ is represented). However, another important scale to consider is that of time. Explain the notion of “separation of timescales.”