Chemistry 4000/5001/7001 Fall 2010 Assignment 8

Due: Friday, Nov. 12, 4:00 p.m.

Marks: 15

1. In class, we studied a simple model of transcription. Add an RNA degradation reaction to this model, i.e. a (mass-action) reaction R $\rightarrow$. Write down the rate equation for the RNA concentration, and add it to the model. You can start with my `xppaut` input file as a base. Submit your modified input file with your assignment. [2 marks]

2. Study the behavior of the model, focussing particularly on the effect on RNA levels, in cases where degradation is slow, fast, or comparable in rate to transcription initiation. Are there major differences in behavior? [8 marks]

3. Try a few different initial functions. For example, you could try having B rise gradually to its value at $t = 0$ instead of jumping up to this value all at once. Do different initial functions make much difference to the behavior of the model? [5 marks]