Homework 13 (part 1)
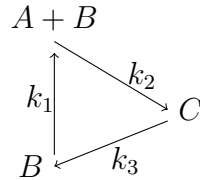
Math 469 (section 500), Spring 2016

This homework is due on Thursday, April 21.

1. Consider the following reaction network:

   (a) Write down the mass-action differential equations for this network.

   (b) Determine the conservation laws.

   (c) Determine how the number of positive steady states $(A, B, C) \in \mathbb{R}^3_{>0}$ depends on k_1, k_2, k_3 (assume that $k_1, k_2, k_3 > 0$).

   (d) Does the Deficiency Zero Theorem apply? Does it confirm your answer to (c)?

2. (This part of your homework pertains to your final project) *You may write this together with your project partner.* Your final paper must extend the results in the paper you are reading and/or critique some scientific or mathematical aspect of the paper. For this homework, *either* (1) describe in a paragraph what your extension and/or critique is, or (2) write a draft of this section of your paper (and you may turn in the complete draft of your paper at this time, if you like). Staple this to the rest of your homework.

3. (This part of your homework also 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) Do the authors state one mathematical result?

   (c) How well do the authors explain the connection of this result to the main scientific/mathematical questions (from the background section)?

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

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