

Dugga 1, TSRT17, 2013-01-23

Each question gives 3 points. 7 points are required to pass. You have approx. 45 min.

1) Consider the following model, in state-space form

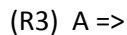
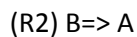
$$d/dt(x_1) = -k_1*x_1 - k_2*x_1 + k_3$$

$$y(t,p) = k_y*x_1$$

$$x_1(0) = x_0$$

- What are the states?
- What are the parameters?
- What are the reactions?

2) Consider the following set of reactions:



- What are the differential equations? Assume mass action kinetics for R1 and R3, and Michaelis-Menten kinetics for R2. Don't forget to specify the initial conditions. Specify some values for any parameters you might introduce.
- Add a measurement equation saying that you can measure something that is proportional to the sum of A and B.

3) Cost functions

- What is the input and output of a cost function?
- What are the residuals, and how do they relate to the cost function?
- Why is the standard deviation of the measurement noise used in the expression of the cost function?

Good luck!

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