Department of Chemical Engineering
University of Cambridge – Weblab Exercise (due April 6, 2007 at 1 pm)
Part 2 – Post Lab Write-Up

Four runs were completed during the two recitations on Monday, March 19, 2007. The settings for the four runs are given below:

Run	Q_1 (NaOH) (mL/min)	Q_2 (Phen) (mL/min)
1	8.1	16.9
2	12	13
3	16.9	8.1
4	21	4

The baseline intensity before we started run 1 was $I_0 = 2977 \pm 4$, the stirrer was kept at full power during all four runs, and the temperature of the feed streams and reactor during the four runs was approximately 18°C.

The data from the four experiments are tabulated in .txt files and are posted on the 10.37 Stellar webpage. In each file, the first column is the time (sec) and the second column is $-\ln(I/I_0)$.

The four data sets have been fit to the model:

$$-\ln\left(\frac{I}{I_0}\right) = A + B\exp(-Ct)$$

The parameter values for A, B and C are tabulated below. In addition, figures showing the experimental data and the fit model for each run are included at the end of this assignment.

Run	A	B	C (sec^{-1})
1	2.76	-2.25	.0018
2	2.00	0.56	.0016
3	1.05	0.97	.0019
4	0.44	0.60	.0027

1) Do the values of α, β, k_1, and k_2 that you obtained in the pre-lab provide semi-quantitative agreement with the data measured during recitation? How far off are the predictions that you would make using the model and parameters suggested from the pre-lab information? What could you do to get better predicted parameters?

2) Can you determine the conversion in the experiment we did on Monday from the dataset? Would it be helpful to know the value of "b" that relates $\ln(I/I_0)$ to the concentrations? Explain.

3) From the noise level in the baseline, how close would one expect the agreement to be if the model were perfect and the parameters α, β, k_1, and k_2, and V and flow rates were all known perfectly?