CivE 375 winters 2005

LAB #4 Hints

To produce your lab report:

1) Follow the A to D instructions given in the assignment
1) Be sure to answer each question
   (One question = one or more paragraph, identify your question)
2) Do not forget the introduction and conclusion part
3) Check the marking scheme and be sure that all section corresponding to mark is in your report.

Question #2

When you prepare your standard curves for dye (%T vs. concentration), which you will use to determine the concentration of dye in your reactors at any given time, you may find it useful to approximate your standard curve by fitting a trendline and using the equation that EXCEL generates rather than reading each approximate value off your curve. If a trendline does not fit the data very well, try linearizing certain portions and using that equation (just make sure you only read numbers that actually come from the linear part of the curve).

You may have noticed that the way we defined Co for spike inputs to CFSTR is different in the lab equations than in the notes. Co for the lab equations is the initial concentration of dye in the reactor, not the concentration of dye in the influent.

Co (mol/L) = (conc. of dye) * (vol of dye added) / (vol of reactor)
eg. Co = (1 x 10^{-3} M) * (0.194 L) / (25.03 L) = 7.75 M

Tanks in series CFSTR: use the volume of only one reactor to calculate Co, and n = the number of identical tanks in series.

Plug flow reactor: use the volume of the dye plug for your volume, that is, Co is just equal to the concentration of the dye (1 x 10^{-3} M), otherwise you will end up with a C/Co value greater than one in the effluent.

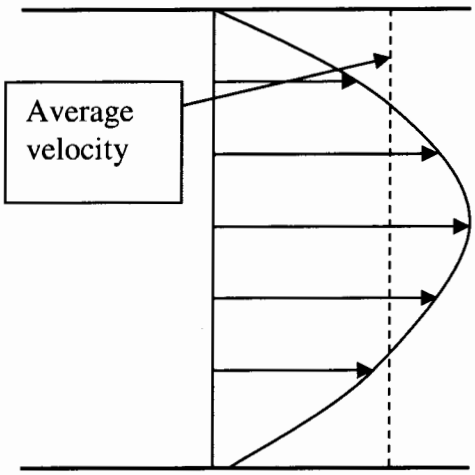
Anyway, you can use either the equations in the notes or the equations in the lab, just be pay attention to what you are actually trying to calculate (and remember to keep your units straight!).

Question #3

Check lab theory for more information.

Question #6

For plug flow, you may notice that experimental results are very different from theoretical. One reason (which Bruce explained on the board) is that we calculate an average flow rate, however based on laminar flow theory, the particles at the walls of the tube move slower and the particles at the center of the tube move faster. Think about how this affects the dye movement.



Question #7

Using graphs/sketches to explain the expected results for your answers to parts (a) and (b) would be strongly recommended.