Due: December 7, 2010

ChE 436 Lab Project 2
Level Control on Shell and Tube Heat Exchanger

The shell and tube experiment is located on the north end of the UO Lab. You are to work on this project in groups of four, and turn in a common report for the group. The purpose of this project is to reinforce the concepts taught in class about process time constants and controller tuning constants. A write-up is required, showing all data, equations used, and intermediate and final results.

Grading

This lab will count for 10% of your grade. Reports will be graded for accuracy and professionalism.

Problem Statement

1. Perform a doublet test on the for the shell and tube heat exchanger, varying the valve control output in manual mode. Make a graph in Excel to turn in with the report.
2. From the manual-mode test calculate FOPDT constants (τ_p, K_p, θ_p) (see Practical Process Control manual). You can use Control Station if you like.
3. Obtain PI tuning constants from the correlations given in the Control Station manual.
4. Use those tuning constants for PI control on the level controller, and observe behavior for step changes in set point above and below the steady-state value.
5. Comment on the performance of the PI controller using the calculated constants.
6. Using the controller tuning guide in the Control Station manual, adjust the constants to improve controller performance.

Cleanup

When you are finished with the experiment set the controller back to automatic mode with the original tuning parameters. Please turn off the water and the experiment.

Help

Please see the web pages for the ChEn 475 experiment before contacting the TAs or Mike Beliveau.

Scheduling

PLEASE do not leave this until the last day. There are 16 groups of 4. My advice is to do this right away.