Chemical Engineering 436
Control System Basics

Objective: To learn the principal parts of a control system and become familiar with some basic control strategies.

Activity: Teach a neighbor the following concepts, based on your reading. Note any questions so that we can discuss these in class.

1. What are the key components of a control system? (Hint: see PPC, Fig. 1.5)

2. Vocabulary (mainly from PDC, Ch. 1)
   - Set point
   - Controlled variable
   - Manipulated variable
   - Disturbance variable
   - Feedback control
   - Feedforward control
   - Analog control
   - Digital control
   - Final control element
   - Manual control
   - Automatic control

The final control element in nearly all chemical process control loops is a valve.

3. Other issues to consider (see PDC, Chapter 1)
   a. What are the advantages and disadvantages of feedback control?

   b. What are the advantages and disadvantages of feedforward control?

   c. Can feedback control ever provide perfect control at the set point? Why or why not?

   d. What does a controller do?

   e. What motivation exists for the use of process control?

4. Scope of this class:
    a. Continuous systems

    b. Single input, single output (SISO) systems

5. Instrumentation (PDC)
    a. First letter corresponds to the controlled variable
        Flow
        Level
        Pressure
        Concentration
        Temperature

    b. Second letter specifies controller or transmitter
        Transmitter
        Controller

    Examples: FC = Flow controller, TT = Temperature transmitter