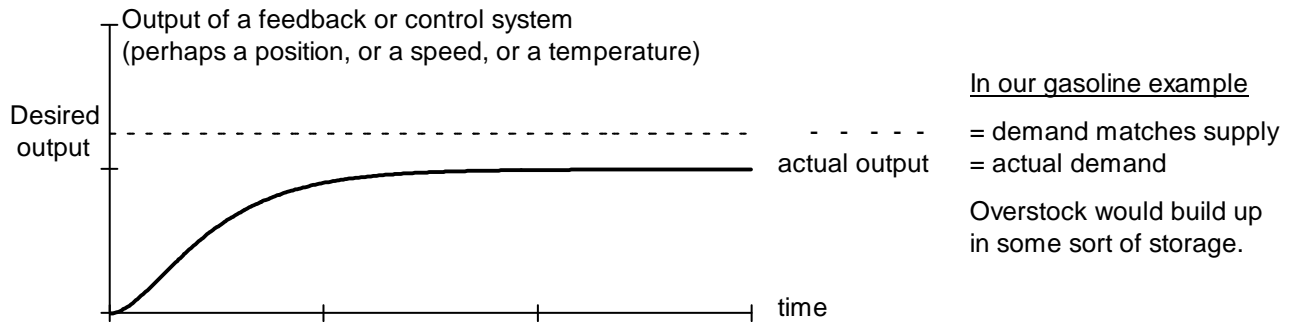


There are a number of lockers on the 2nd floor of the MEB, in the center hallway. These lockers have slots cut in their doors so that homework and lab notebooks can be dropped through the slots. Turn in your homework in the locker marked "ECE 3510 Homework". Homework is due by 5:00 p.m. on the due date.

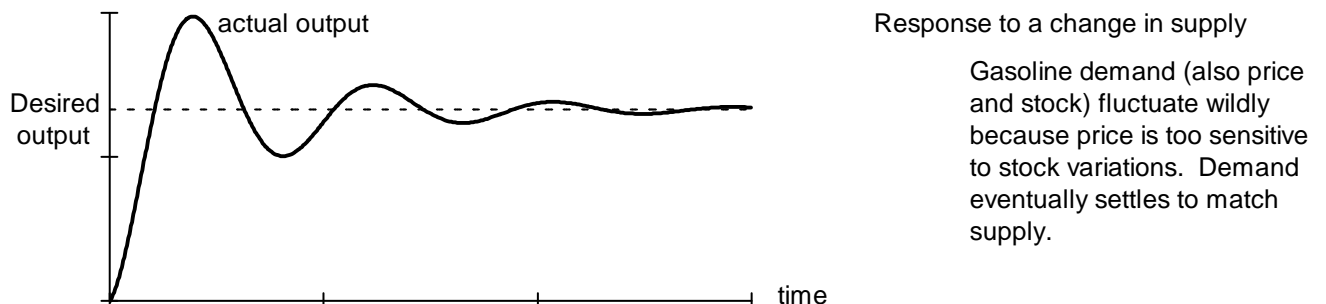
Graded homework, labs and exams will be returned to your mailbox in 2101 MEB

**Identify Feedback Systems** Listen carefully to lecture 1 and/or read Chapter 1 of the Bodson text.

1. Look for feedback systems around your house, school and where you work. Think about the subsystems within your computer, your car, and your entertainment equipment. Think back to previous classes and try to identify feedback systems that were used to stabilize circuits. (You don't need to write anything down here, you'll do that in the next problem, possibly using 2 you've thought of here.)
2. Identify at least 2 different feedback systems found around your house, school and where you work. For each of these systems:
  - a) Draw a system diagram, identifying each of the parts (controller, plant, feedback signal and/or sensor, and possibly others). If you're not sure how the system works or how individual parts of the system work, make educated guesses— think how you would make such a system work. You will almost certainly have to simplify the system, considering only one input, one output, and one type of feedback. Assume all else which may affect the output is held constant. For instance, if you were thinking about people making choices about buying gasoline (P), you might consider supply amount as the input (r), sales amount as the output (y) and price (u) as the only thing which makes the two match. You could then neglect seasonal effects, availability of mass transit or how the price might also affect the supply amount. (The controller (C) would be some factor which related price to the difference between supply and demand. Both C and P have negative factors-- demand rises when price goes down.)
  - b) Identify the input on the drawing (may be zero or some reference value).
  - c) Identify the output (response).
  - d) Identify the feedback signal (often same as the output).
  - e) What would happen if this system did not respond accurately to the control and the output looked like that shown below (or like Figure 1.2 b in the Bodson text)?



- f) What would happen if this system responded to the control with overshoot or ringing like that shown below (or like Figure 1.2 c in the text)?



3. Repeat problem 2a) for a feedback system outside of your normal environment.
4. Repeat problem 2a) for a natural feedback system, that is, not made by man.