ECE/MAE 5310 Schaum's Control and Feedback Systems (SFCS)

Chapter 2 Material

Today's Topics

Ideal Systems (Top Down Design)

Basic Feedback Structure

Feedback System Example

Why Isn't Feedback Perfect?

- cost of feedback
- instantaneous response not possible
- other?

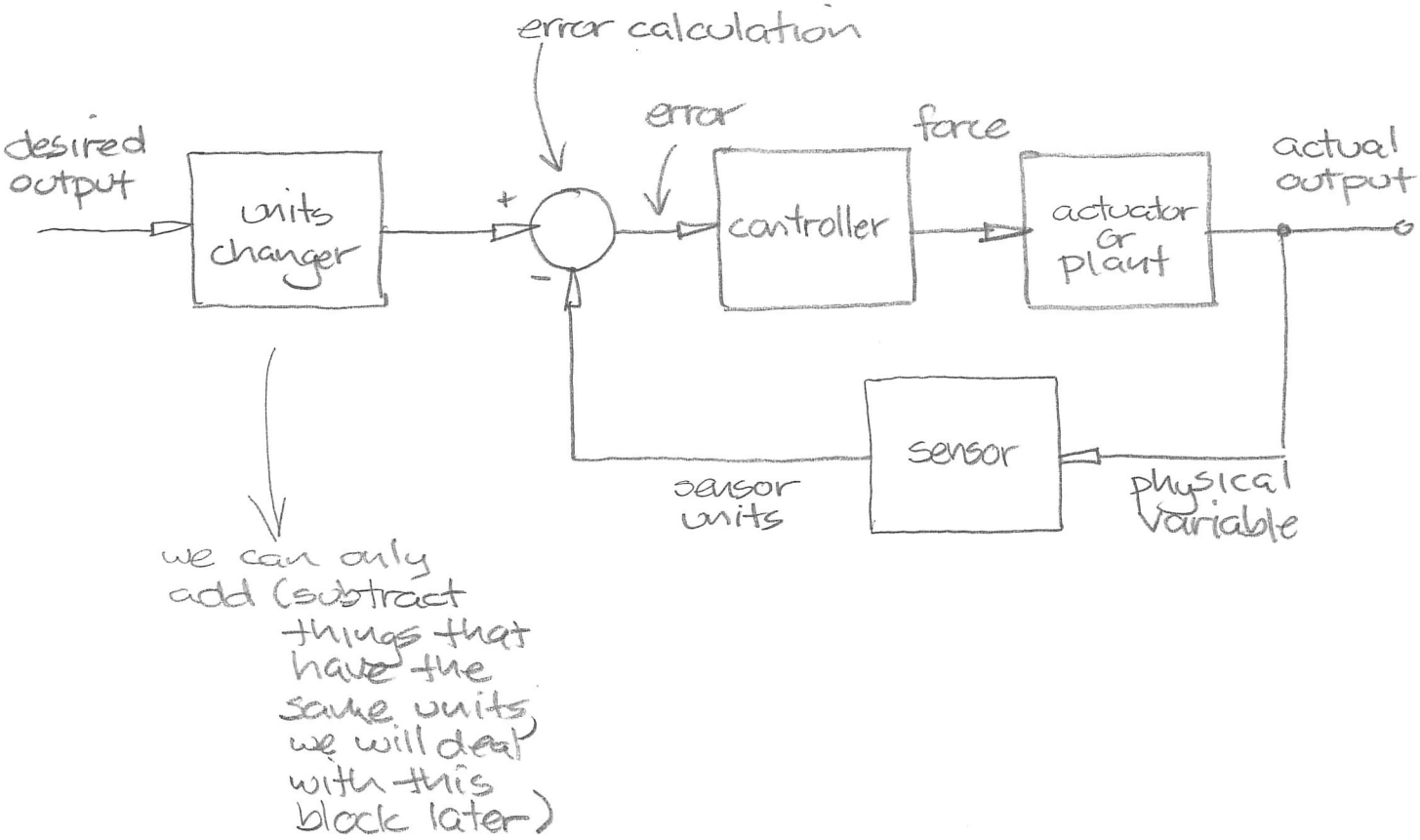
Critical Feedback System Issues

- stability
- performance
  - speed
  - oscillatory nature

Block Diagram Fundamentals

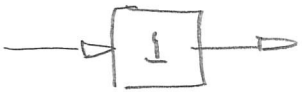
Reading by next Wednesday Chapters 1-3

The Basic (or Typical) Feedback Structure



Why Isn't Feedback Perfect?

Ideally, we would add feedback to a device/process we want to control and it would turn into that ideal system



Unfortunately it doesn't happen. Reasons are:

(1) Instantaneous response is not possible.

(we will have to settle for ideal over a range)

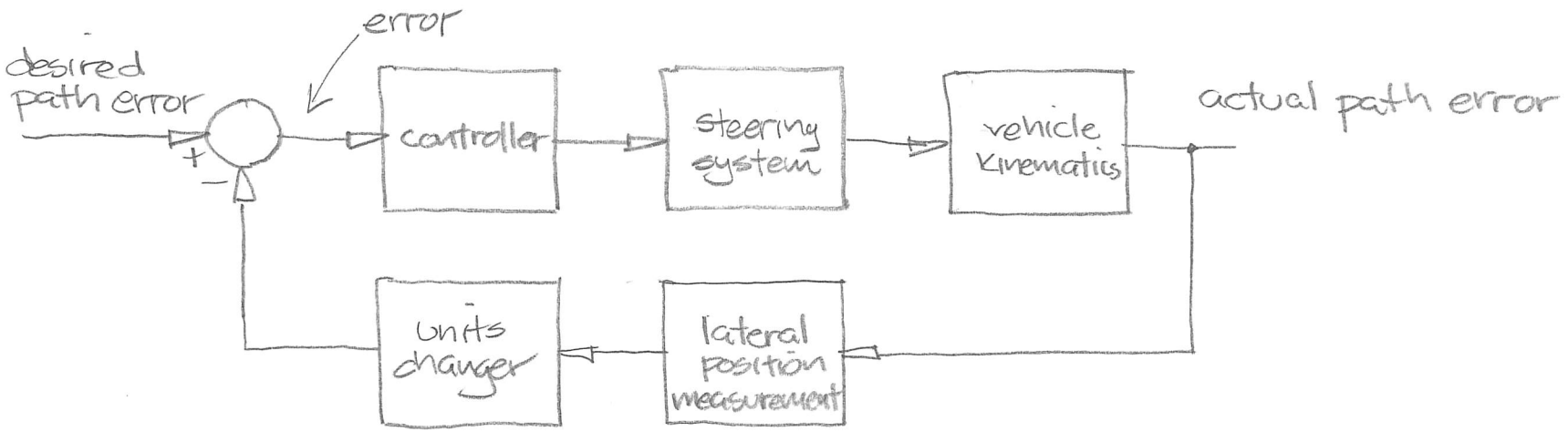
(2) Feedback comes with costs, two primary costs are:

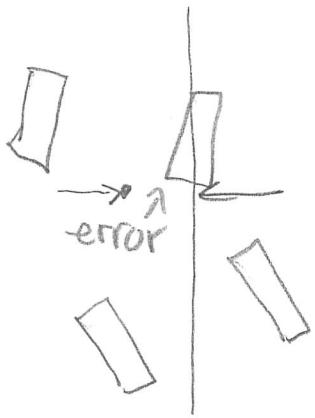
(a) the sensor

(b) we create the potential for destabilizing stable systems.

Feedback System Example

Lateral Control of an Automobile





I can put this where I want and shortly we will eliminate it altogether.

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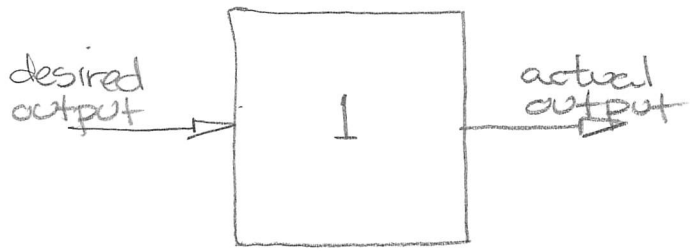
Ideal Systems

In an ideal system, the desired output and the actual output are always the same. Such a system is



The system 'transfers' the desired output to the actual output instantaneously. The system tracks exactly.

(Perfect teenager)

While the perfect system is <u>not</u> possible, drawing the above block diagram is a starting place for design. It is the top-level diagram and it indicates we know what we're after.