

Intro To Control Systems

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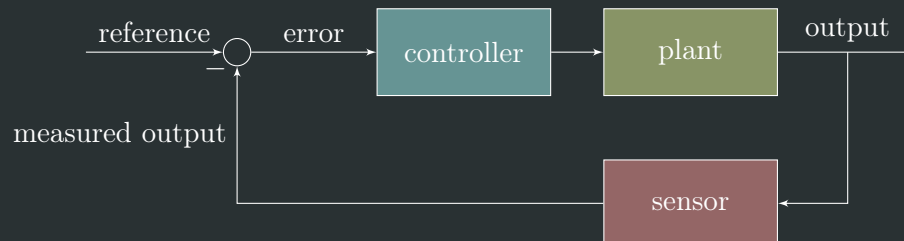
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1 Basics of Control Systems

Control systems have:

- some reference/desired output
- a controller that provides an input into a system
- possibly some disturbance that influences the input
- a system that takes in input and produces some output
- a sensor that reads the output and feeds this to the controller
- some noise that influences the output read by the sensor

If the measured output is subtracted from the desired output, it is negative feedback control. If it is added, it is positive feedback control.



2 Control System Design

Consists of the following steps:

1. Study the system to be controlled and establish control goals.
2. Identify variables to be controlled.
3. Define control specifications (performance metrics).
4. Obtain a model for the system (first principles or data).
5. Simplify the model as much as possible.
 - (a) No extra info
 - (b) Linearize to simplify
6. Design the controller and select key parameters to be adjusted.
7. Simulate the controlled system (unsimplified).
8. Optimize the parameters and analyze performance through iterating if necessary.