Chapter 9: Introduction to Control

July 28, 2015

Outline

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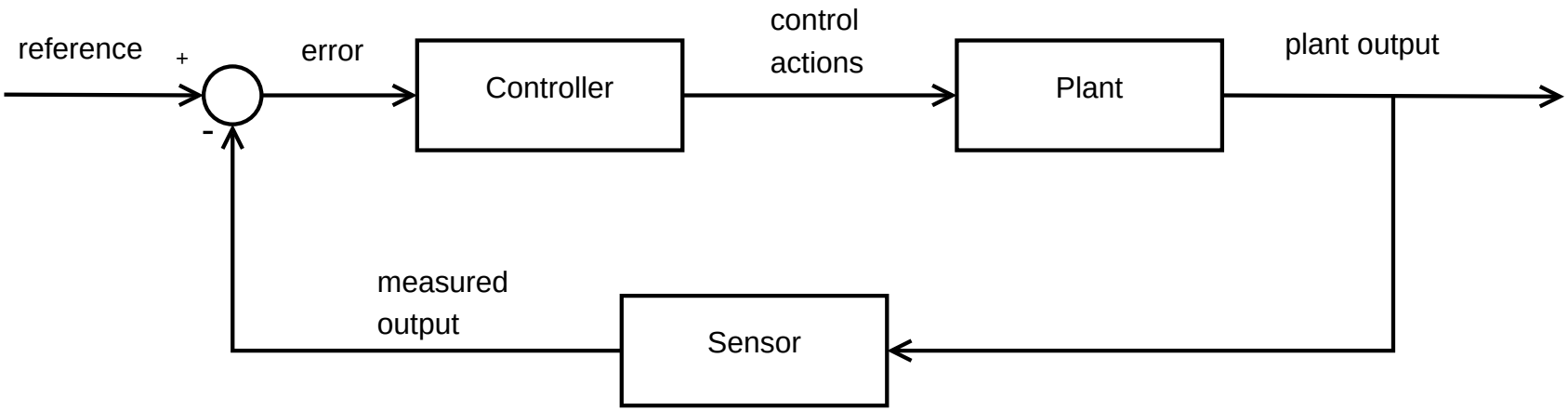
What is control theory?

Control theory is an interdisciplinary branch of engineering and mathematics that deals with the behavior of dynamical systems with inputs, and how their behavior is modified by feedback. The usual objective of control theory is to design a controller that produces inputs to a plant so its output follows a desired reference signal which may be a fixed or changing value. - wikipedia



Controllers

Types of controllers

- On-off controller
  - e.g., Thermostate at home
- **PID controllers, Lead and lag compensators (this course)**
  - Cruise-control in your car
  - Temperature, level, flow, presssure, pH, ... in chemical plants
- More advanced controllers
  - State-space feedback controllers (e.g., LQR)
  - Model Predictive Controller (MPC)
  - Fuzzy Control
  - Neuro-fuzzy Control
  - ...