# UNIT-1

# (Lecture-2)

## Feedback and its Effect

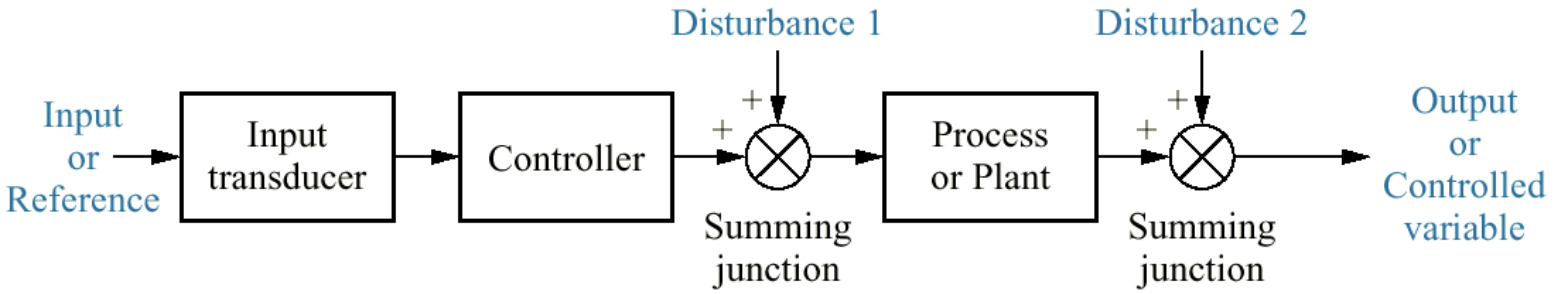
# Types of Control Systems

## Open-Loop

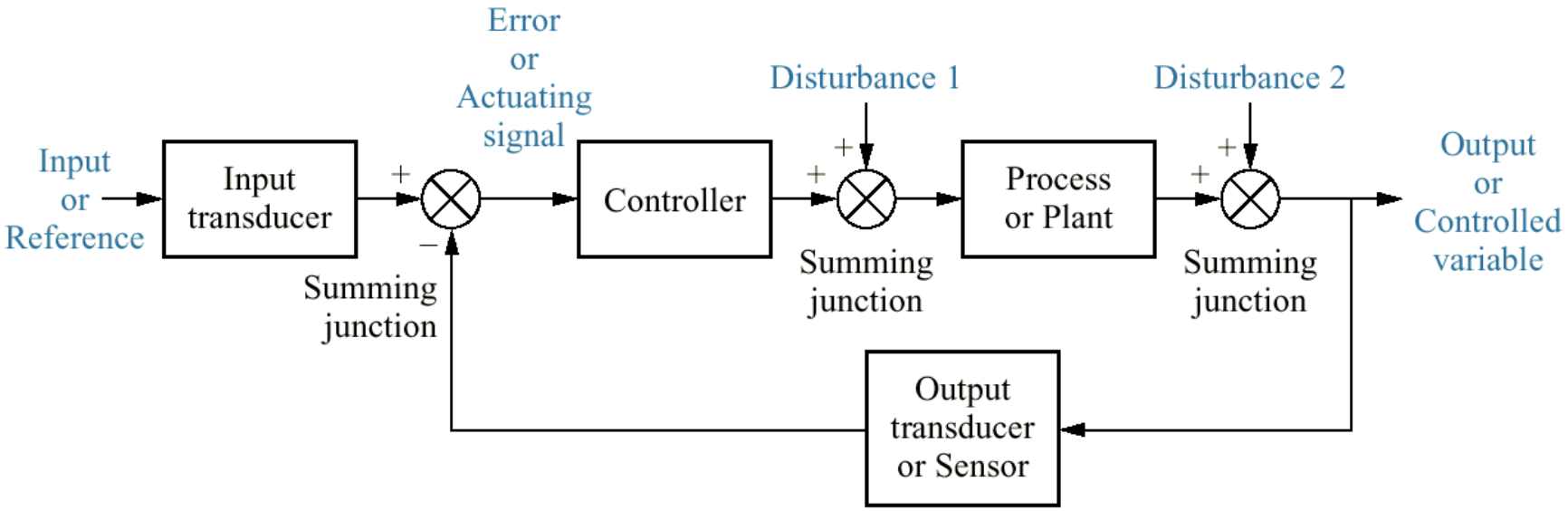
- Simple control system which performs its function with-out concerns for initial conditions or external inputs.
- Must be closely monitored.

## Closed-Loop (feedback)

- Uses the output of the process to modify the process to produce the desired result.
- Continually adjusts the process.


Disturbance 1
Disturbance 2
Input
or
Reference
Input
transducer
Controller
+
+
Summing
junction
Process
or Plant
+
+
Summing
junction
Output
or
Controlled
variable

(*a*)


Error
or
Actuating
signal
Disturbance 1
Disturbance 2
Input
or
Reference
Input
transducer
+
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Summing
junction
Controller
+
+
Summing
junction
Process
or Plant
+
+
Summing
junction
Output
or
Controlled
variable
Output
transducer
or Sensor

(*b*)

# Advantages of a Closed-Loop Feedback System

- **Increased Accuracy**
  - Increased ability to reproduce output with varied input.
- **Reduced Sensitivity to Disturbance**
  - By self correcting it minimizes effects of system changes.
- **Smoothing and Filtering**
  - System induced noise and distortion are reduced.
- **Increased Bandwidth**
  - Produces sat. response to increased range of input changes.

## Major Types of Feedback Used

- **Position Feedback**
  - Used when the output is a linear distance or angular measurement.
- **Rate & Acceleration Feedback**
  - Feeds back rate of motion or rate of change of motion (acceleration)
  - Motion smoothing
  - Uses a electrical/mechanical device call an accelerometer