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Controllers

A controller is a device which receives an input signal and some feedback then processes it to give a output signal as per desired conditions, a predefined algorithm is written for it’s working. It is used to establish a stability by decreasing the steady state error or removing noise. The controller takes control action through two systems open loop or closed loop control. In open loop it doesn’t receive any feedback from the output so it is independent from it whereas in closed system it receives a feedback from the output which makes the controller to process in different way. Closed loop system can also be called feedback control system.

Now there are two major controller’s continuous controllers and discontinuous controllers. The continuous controller has the variable and parameter continuous like a sin(x) graph. Discontinuous controller has the variable and parameter as discrete like binary format like on or off.

Continuous and Discontinuous system are further classified. Discontinuous controller can be two position, three position or multi-position. There are 3 basic Continuous controller -Proportional controllers, Integral controllers and Derivative controllers.

We now use these controllers’ combination to control the system to get desired output.

1. Proportional and integral controllers (PI Controller)
2. Proportional and derivative controllers (PD Controller)
3. Proportional integral derivative control (PID Controller)

Proportional controller – The output is directly proportional to the error signal

Mathematically, A(t) = Kp\*e(t)

Kp 🡪 proportional constant

Integral controller- The output is directly proportional to the integral of the error signal

Mathematically, A(t) = Ki\*

Ki 🡪 integral constant

Derivate controller-- The output is directly proportional to the derivative of the error signal

Mathematically, A(t) = Kd\*

Kd 🡪 derivative constant