Note Title 20-01-2020

HW 1.

In each problem, derive the plant transfer function, find the poles, and calculate the unit step response.

1). $\ddot{y}(t) + \dot{y}(t) = u(t)$.

2). $\ddot{y}(t) + 2\dot{y}(t) + 2y(t) = u(t)$.

3). $\ddot{y}(t) + y(t) = u(t)$.

HW2.

In each problem, find the system response to the given input under zero initial conditions and comment.

1). $\ddot{y}(t) + \dot{y}(t) = u(t)$, $u(t) = \sin(t)$.

2). $\ddot{y}(t) + y(t) = u(t)$, $u(t) = \cos(t)$.

HW 3.

Determine the unit step response of each of the following systems and comment on the effect of zeros.

1). $\ddot{y}(t) + 11\dot{y}(t) + 10y(t) = u(t).$

2). $\ddot{y}(t) + 11\dot{y}(t) + 10y(t) = \dot{u}(t) + 2u(t).$

3). $\ddot{y}(t) + 11\dot{y}(t) + 10\,y(t) = -\dot{u}(t) + 2u(t).$

HW 4.

1). The governing equation of a 2nd plant is $\ddot{y}(t) - \dot{y}(t) = u(t)$. Design a unity feedback closed loop control system for the same. Try P, PI and PD control, in this order.

HW 5.

1). The open loop transfer function of a unity negative feedback closed loop system is $\frac{K(s+2)}{s(s-2)}$, $K > 0$. Plot the locus of the closed loop poles.