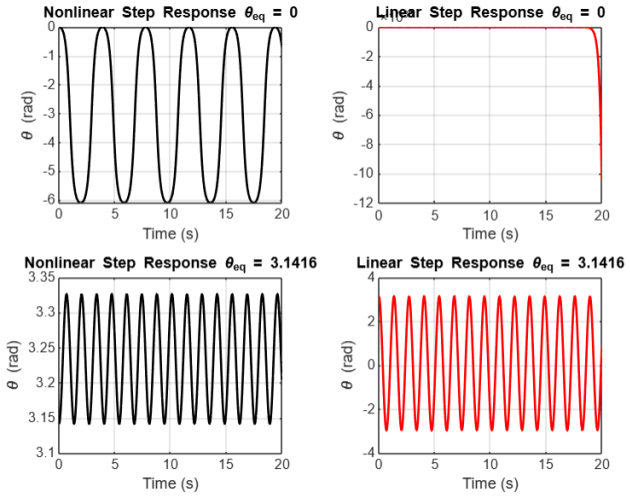
Ae322 Assignment 1

Results Obtained:

Part e :

i. the time response obtained from the original dynamical equations from a unit step input, with the initial conditions as equilibrium points.

ii. the unit step response of the linearised systems, with the initial conditions as equilibrium points**.**

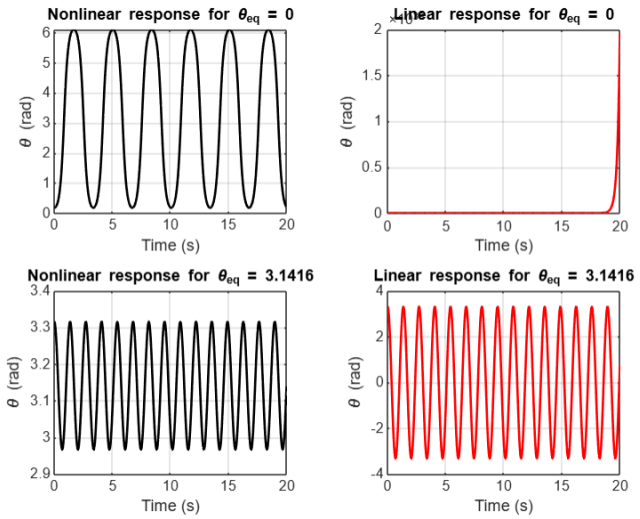


Part f :

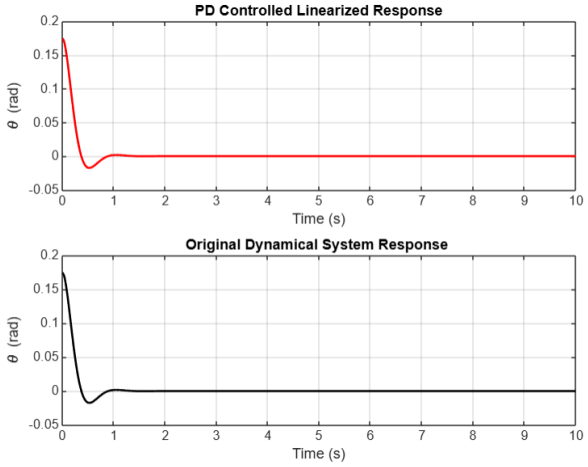
Simulate the dynamical system for 20 seconds taking the initial conditions as θ = 10 $degrees$ $\dot{\theta}$ = 0 $degrees/sec$ and $u(t) \equiv 0$, using

i. The original dynamical equations.

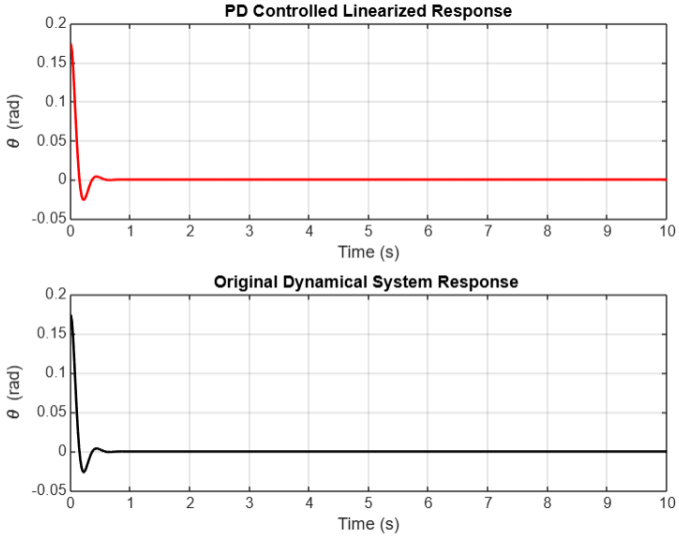
ii. ii. The linearized equation of motion, which is obtained from linearization at the nearest equilibrium point of the given initial conditions.



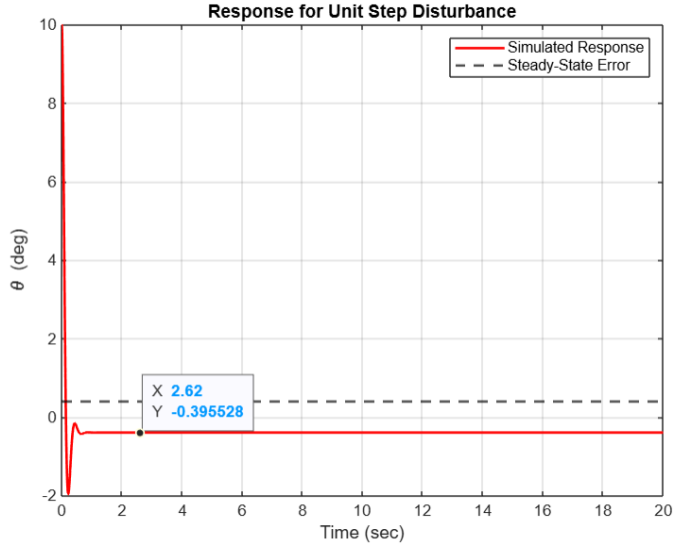
Part g: Mp = 10%, Ts = 1 sec



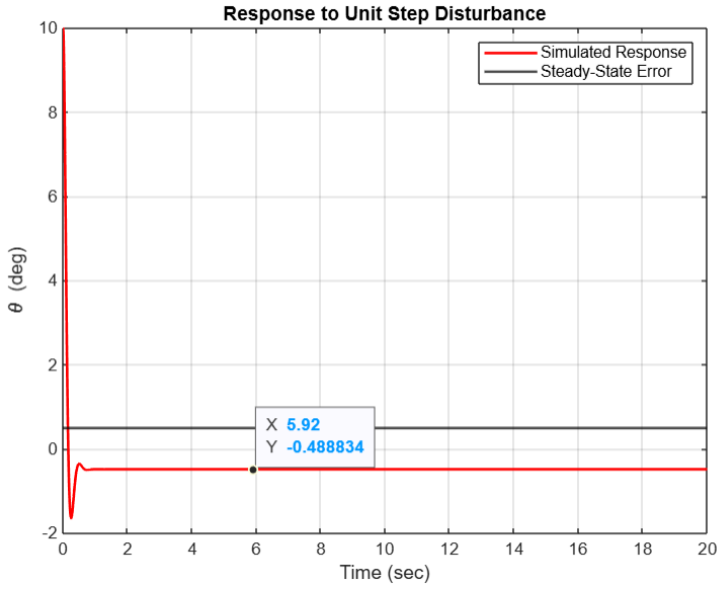
Part h: Mp = 15%, Ts = 0.5 sec



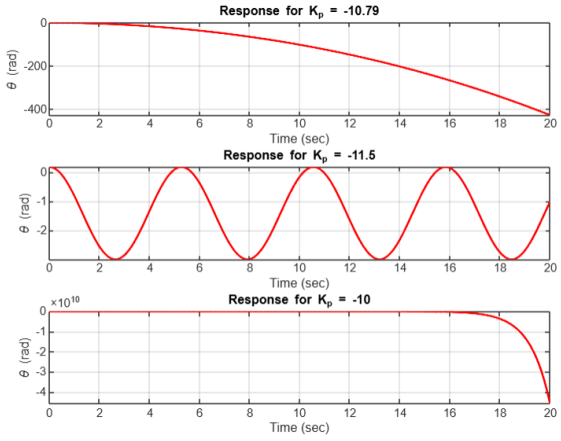
Part i:

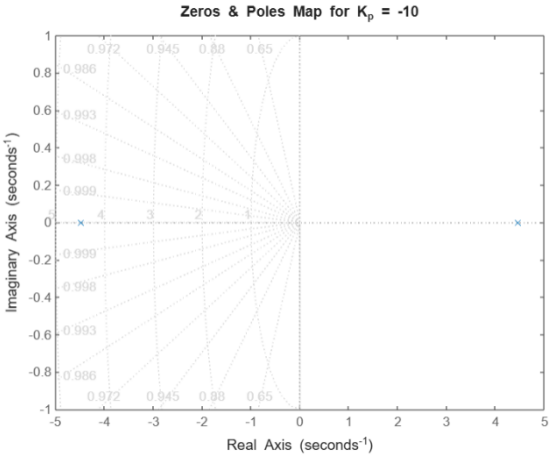


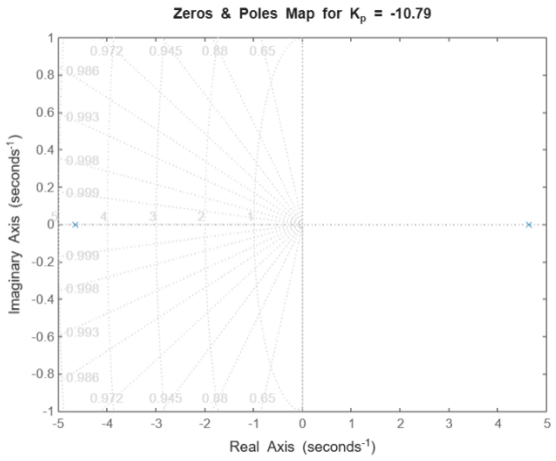
Part j :

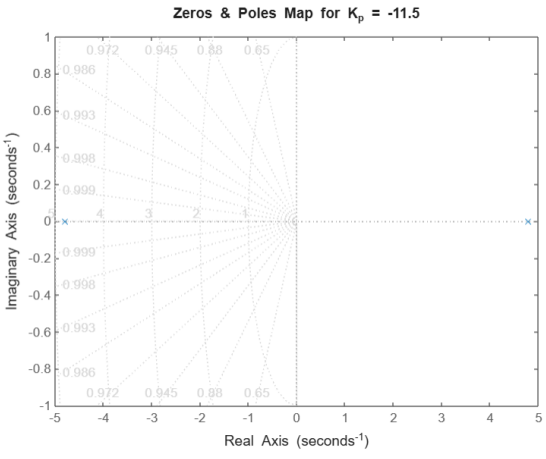

Response to Unit Step Disturbance
Simulated Response
Steady-State Error
X 5.92
Y -0.488834
θ (deg)
Time (sec)

Part k:


Response for K_p = -10.79
Response for K_p = -11.5
Response for K_p = -10
θ (rad)
Time (sec)


Zeros & Poles Map for K_p = -10
Imaginary Axis (seconds^{-1})
Real Axis (seconds^{-1})


Zeros & Poles Map for K_p = -10.79
Imaginary Axis (seconds^{-1})
Real Axis (seconds^{-1})


Zeros & Poles Map for K_p = -11.5
Imaginary Axis (seconds^{-1})
Real Axis (seconds^{-1})