

Experiment No. 8

Aim: (a). Study of time response of 2nd Order System using Proportional-Integral-Derivative (PID) Controller.

(b). Compare P, PI and PID control responses for the given transfer function model.

Objective: To Plot Step Response and compare Open Loop System with Closed Loop PID Controller for 2nd order system (mass-spring-damper system) and compare the responses for P, PI and PID controllers using Simulink.

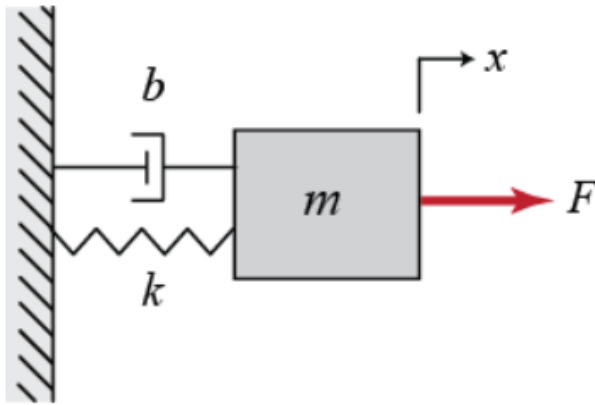


Fig.1: 2nd order system (spring-mass-damper system)

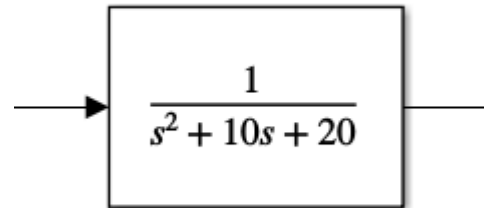


Fig.2: System Transfer Function

MATLAB/Simulink Model:

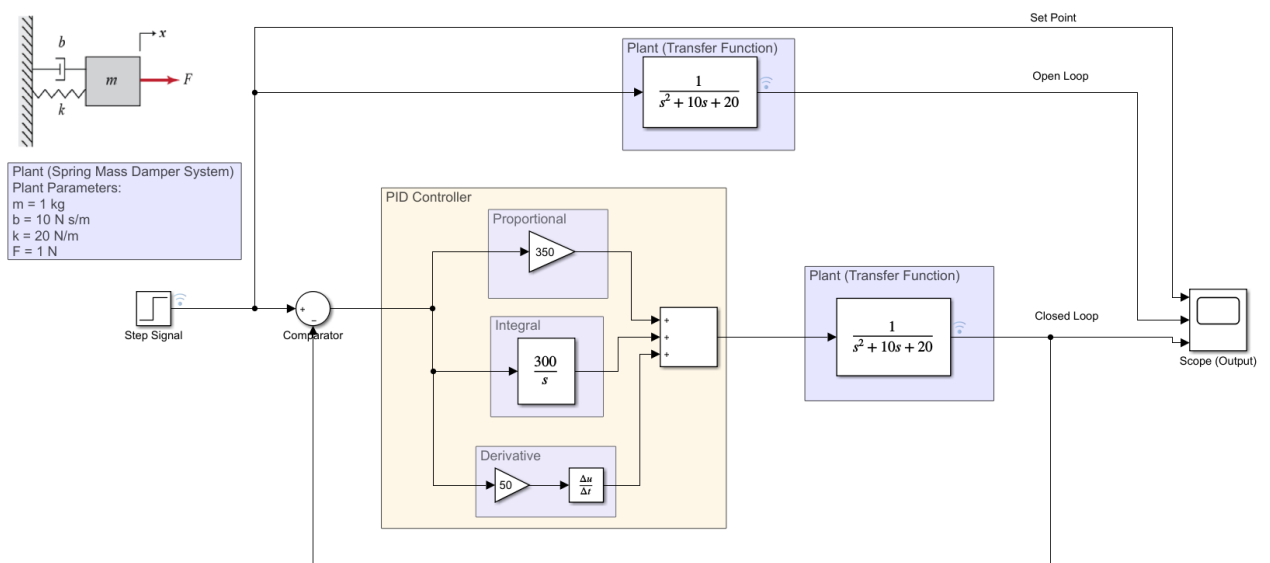


Fig.3: Simulink model of closed loop PID controller with 2nd order system.

Expected Results:

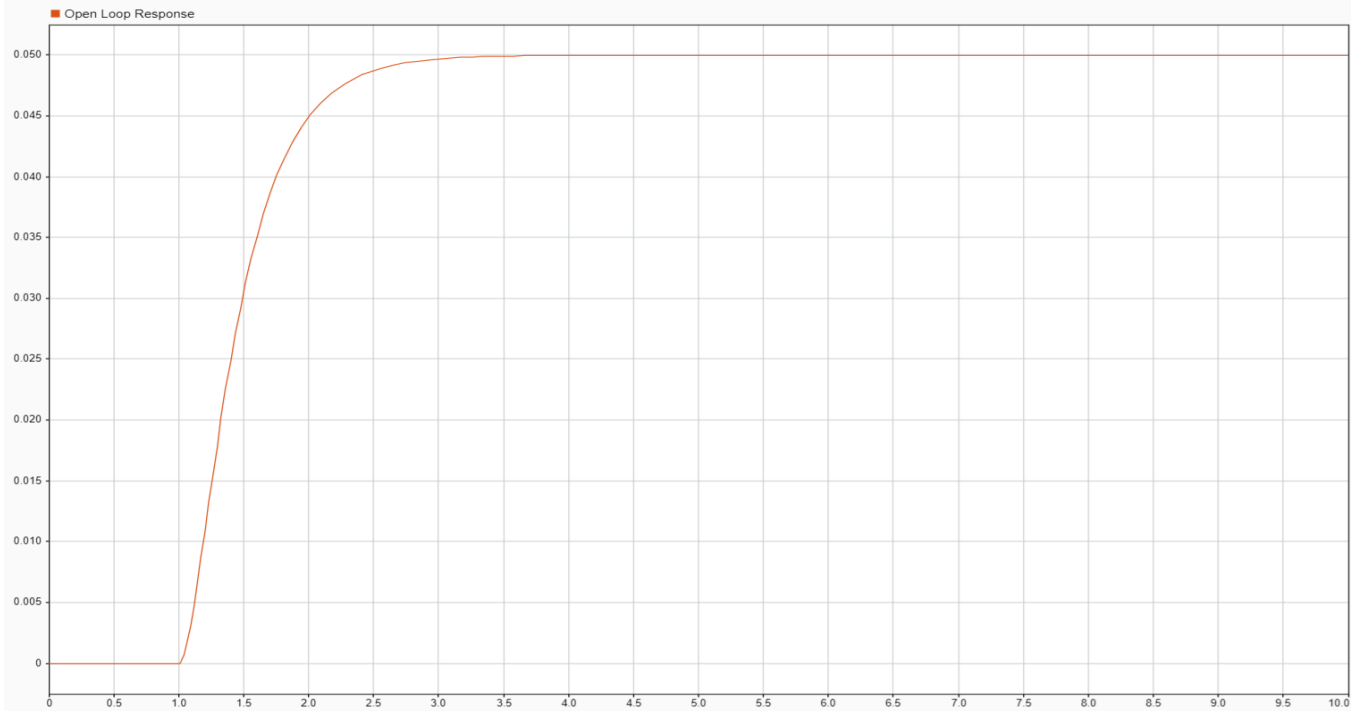


Fig.4: Open Loop Response of 2nd order spring-mass-damper system.

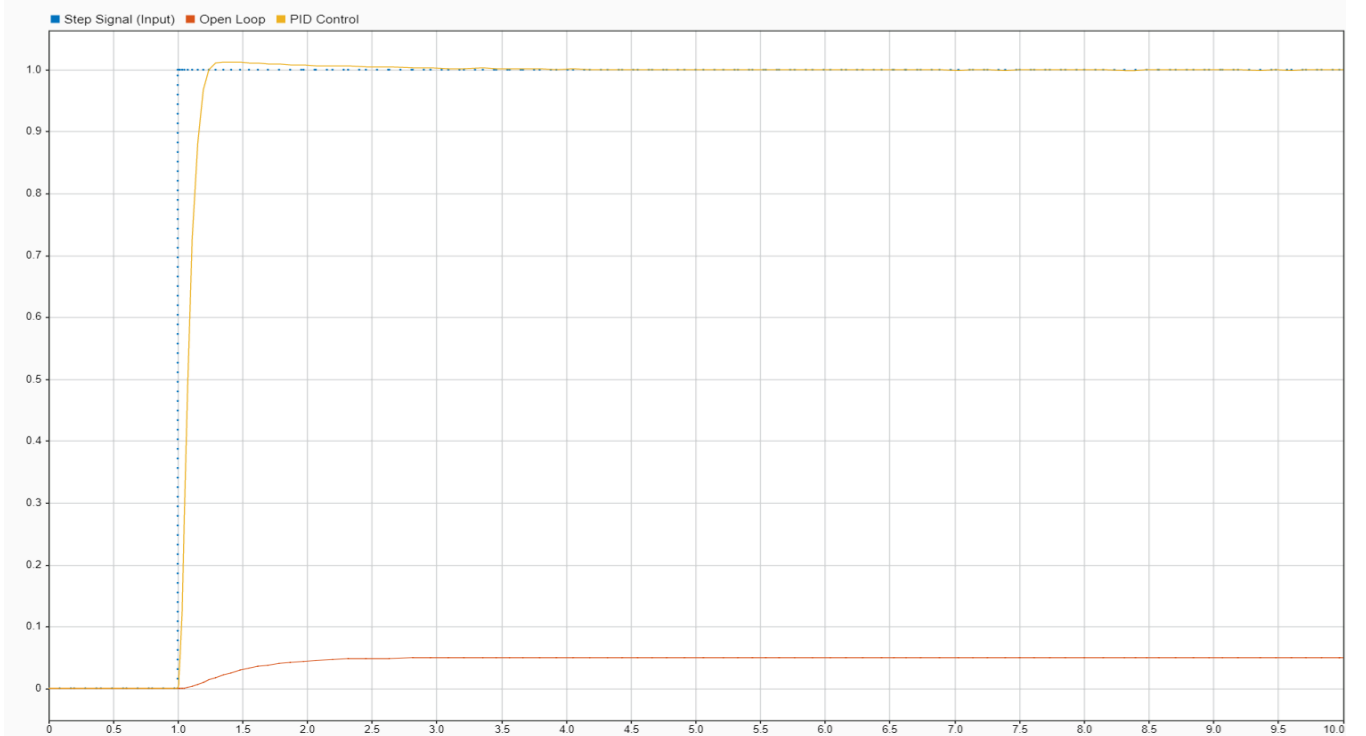


Fig.5: Closed Loop Response using PID Control on 2nd order spring-mass-damper system.

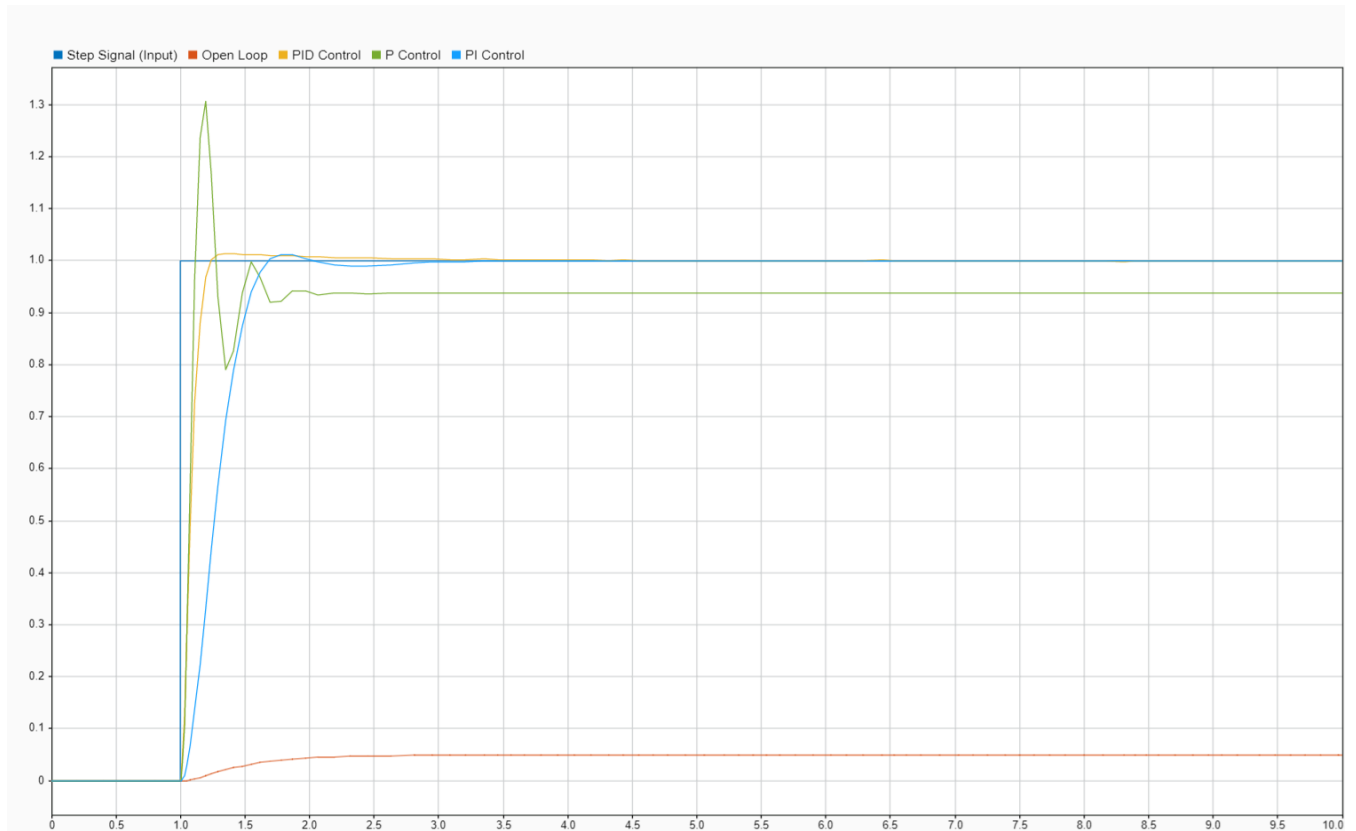


Fig.6: Comparison of P, PI and PID controllers on 2nd order spring-mass-damper system.

Practice Problem:

Q). Plot Step Response of the given transfer function model with P and PI controller using MATLAB/Simulink.

$$G(s) = \frac{2s + 5}{s^2 + 2s + 4}$$

Assume $K_p = 2$, $K_i = 6$ and $K_d = 1$.