ChE-381: Process Dynamics and Control
Simulation Session 7

Problem statement

Consider two first-order systems in series with

$$G_p = \frac{1}{(2s+1)(5s+1)}$$

Let the measuring device and control valve dynamics be given as follows:

$$G_m = \frac{1}{10s+1}$$

$$G_v = 1$$

The transfer function corresponding to a disturbance variable is given by:

$$G_d = \frac{1}{s+1}$$

a) Show the step response and the tangent line at inflection point in a plot.

b) Implement PI controller for servo and regulatory control using Cohen-Coon settings and show the dynamic response of the system. Assume step change in set point and disturbance variable.

c) Make a Bode plot of the closed loop system with PI controller parameters obtained in part (b).

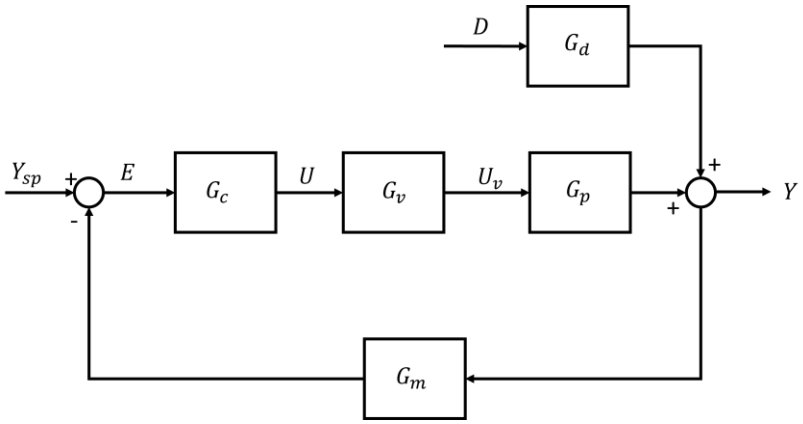

Figure 1. Closed loop system with valve and measurement device dynamics.

Submit a zipped folder containing a plot for part (a), a .txt file with the PI control parameters obtained in parts (b), two figures for part (b), and a figure for part (c). Name the folder as your roll number.