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كلية الهندسة
قسم هندسة الحاسبات والنظم

Title: **PID Tuning and Simulation for Mag. Lev. System (Student Task)**

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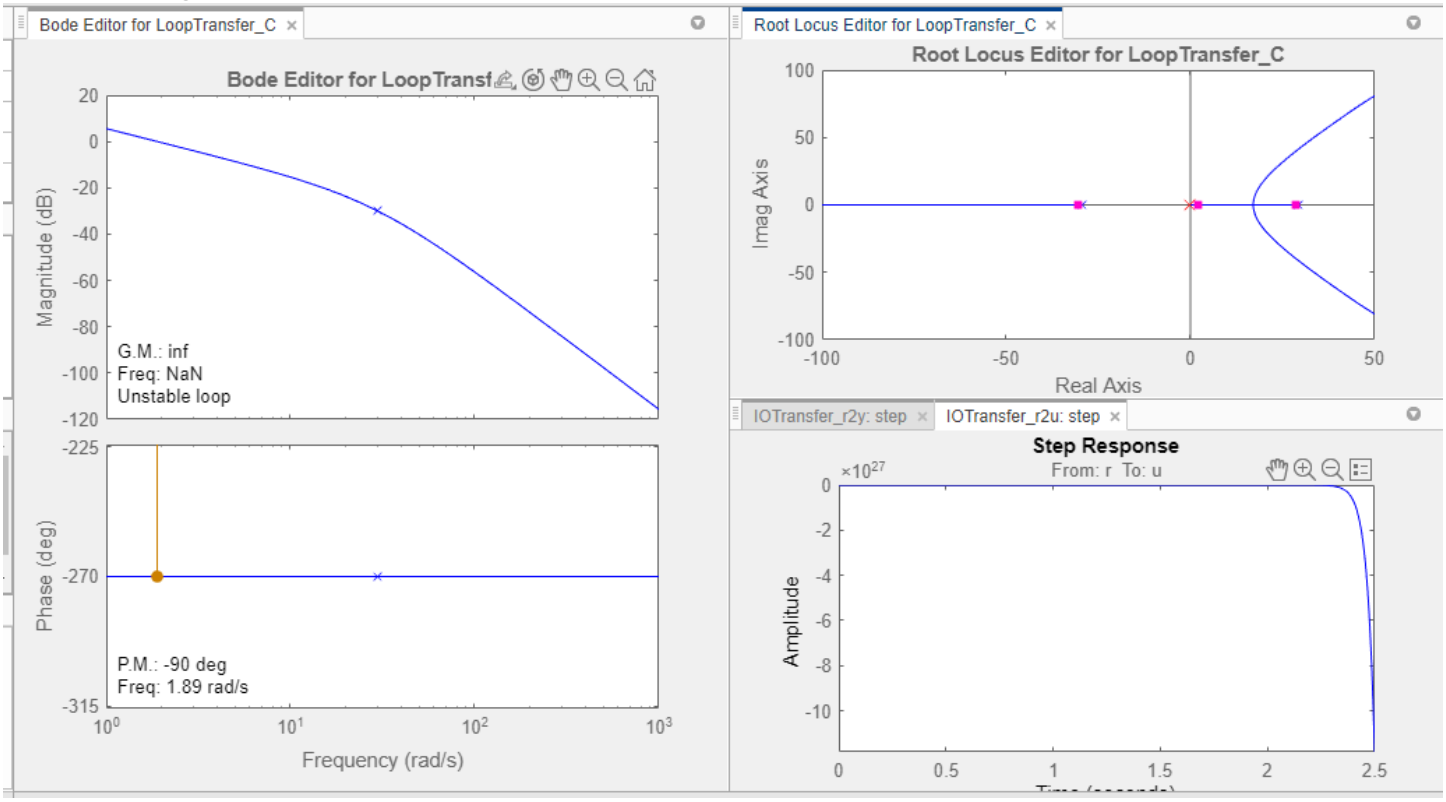
Answer the following questions:

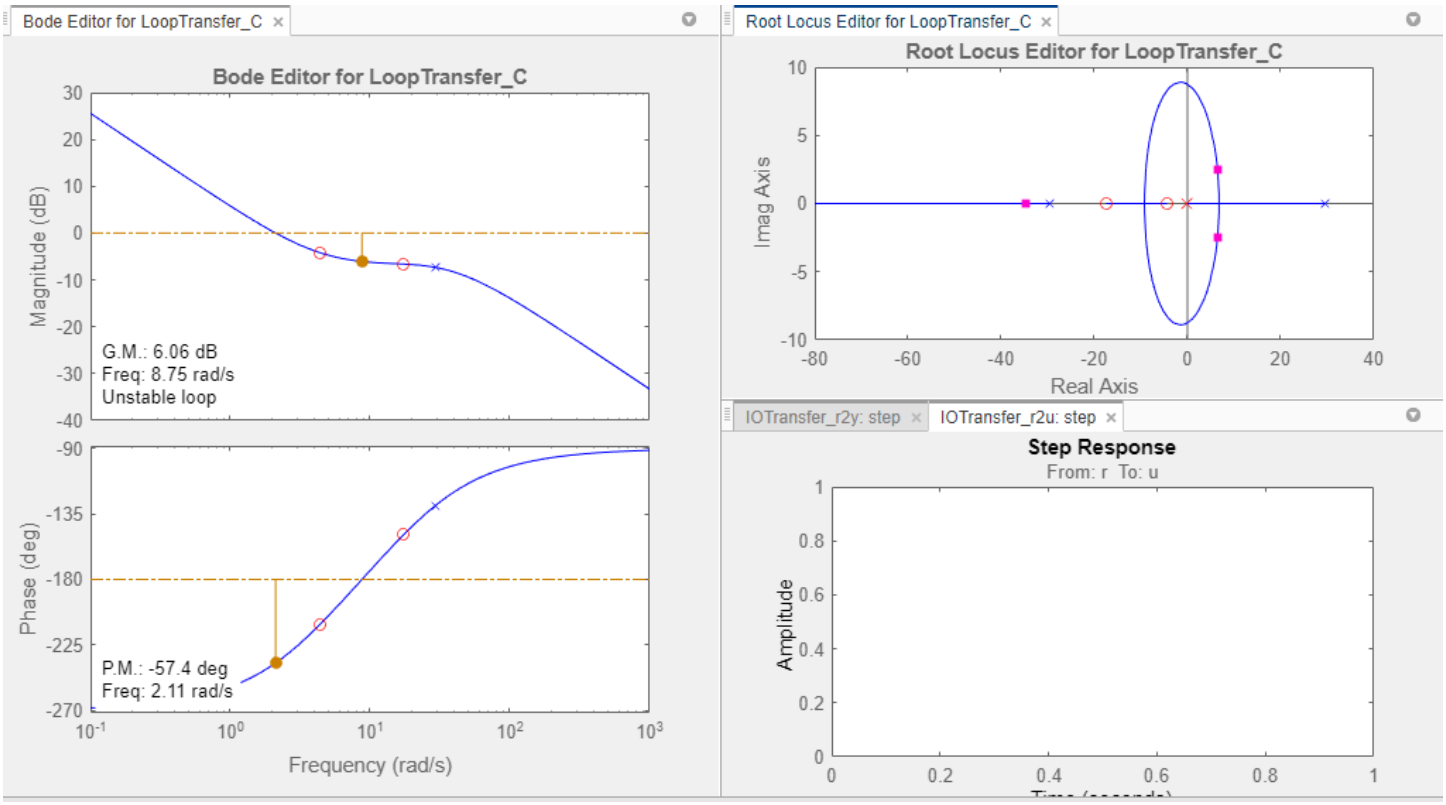
1- Design the PID controller for MagLev system using ***sisotool*** then plot the step response and the control action of the controller. (Write the controller parameters and take screenshots for each step)

- Controller Parameters:
  Kp=1.1543, Ki = 2.1241, Kd = 0.0368, Tf = 0.000266

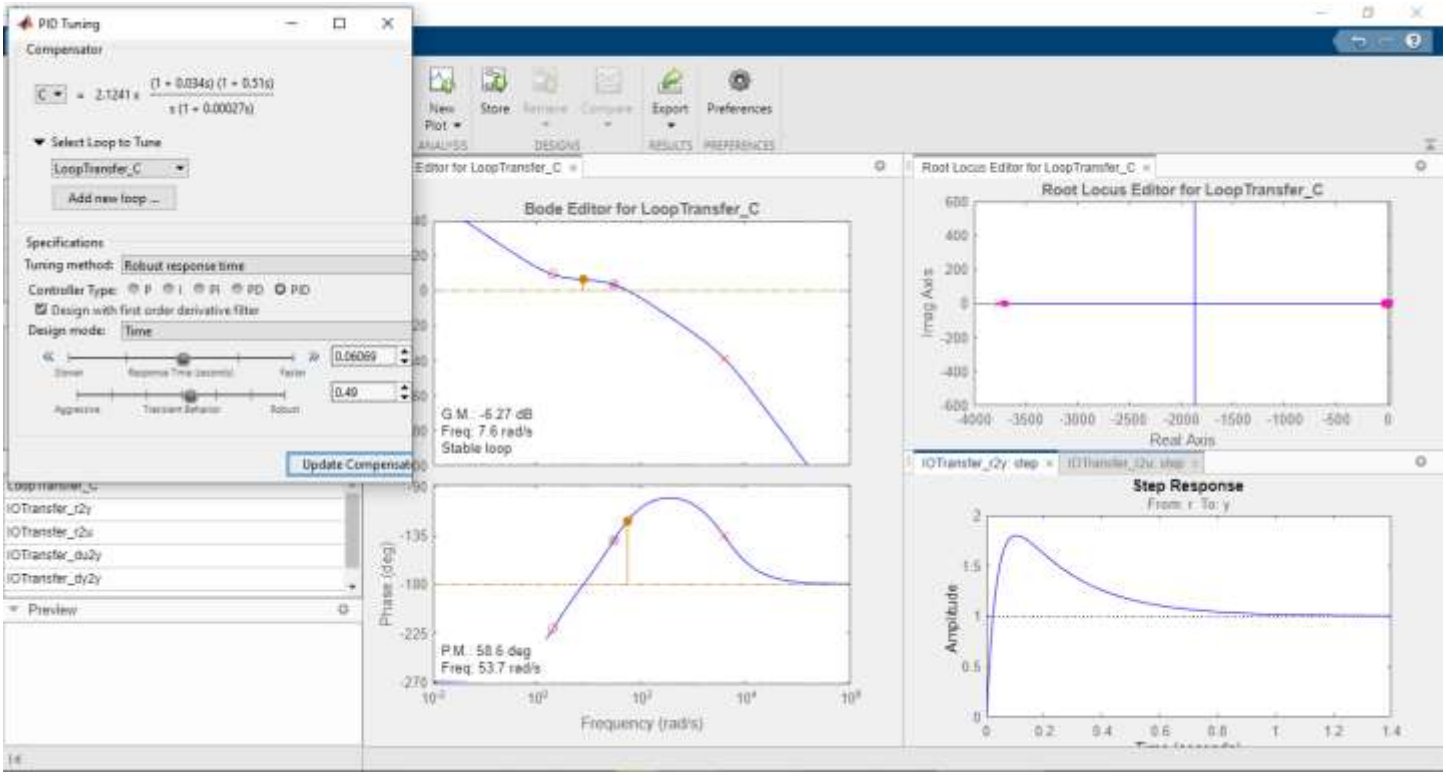
1. Add an integrator



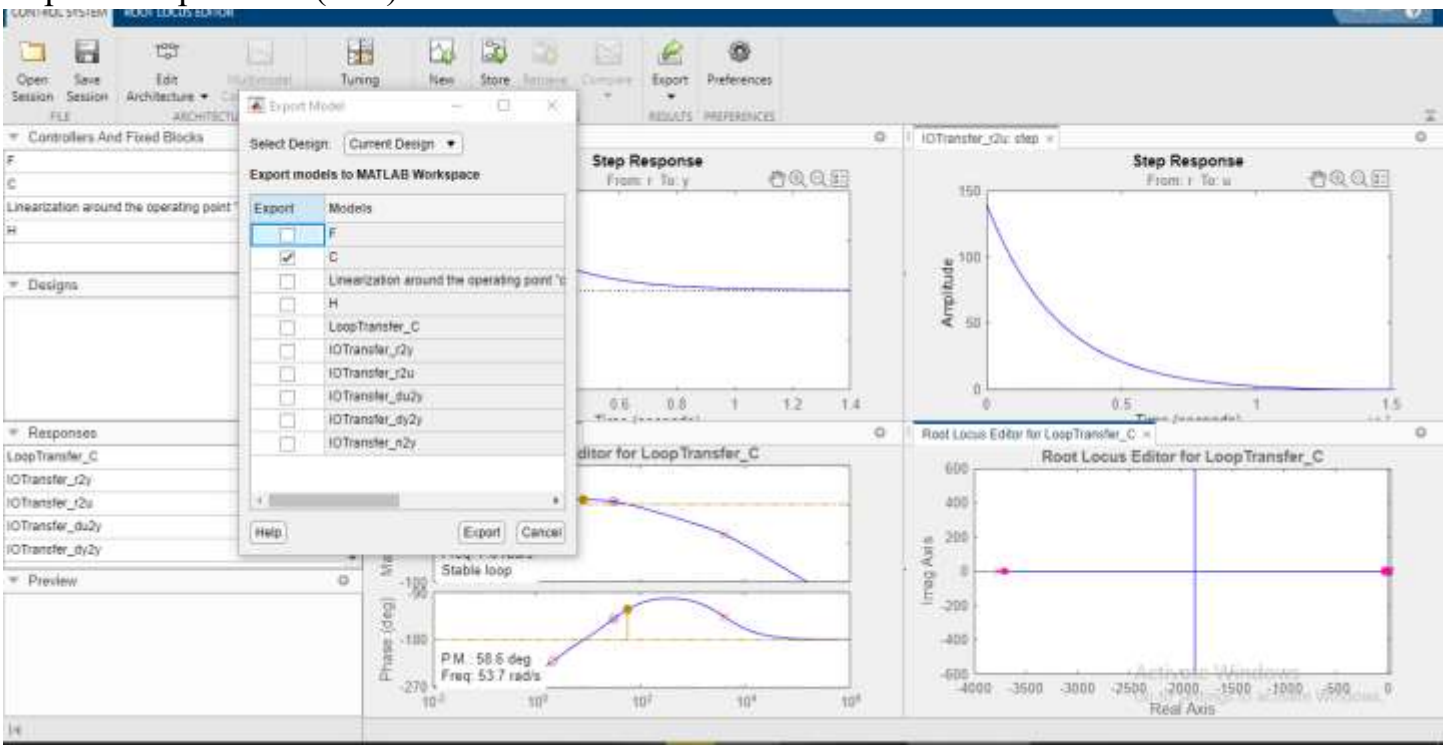
2. Add two real zeros



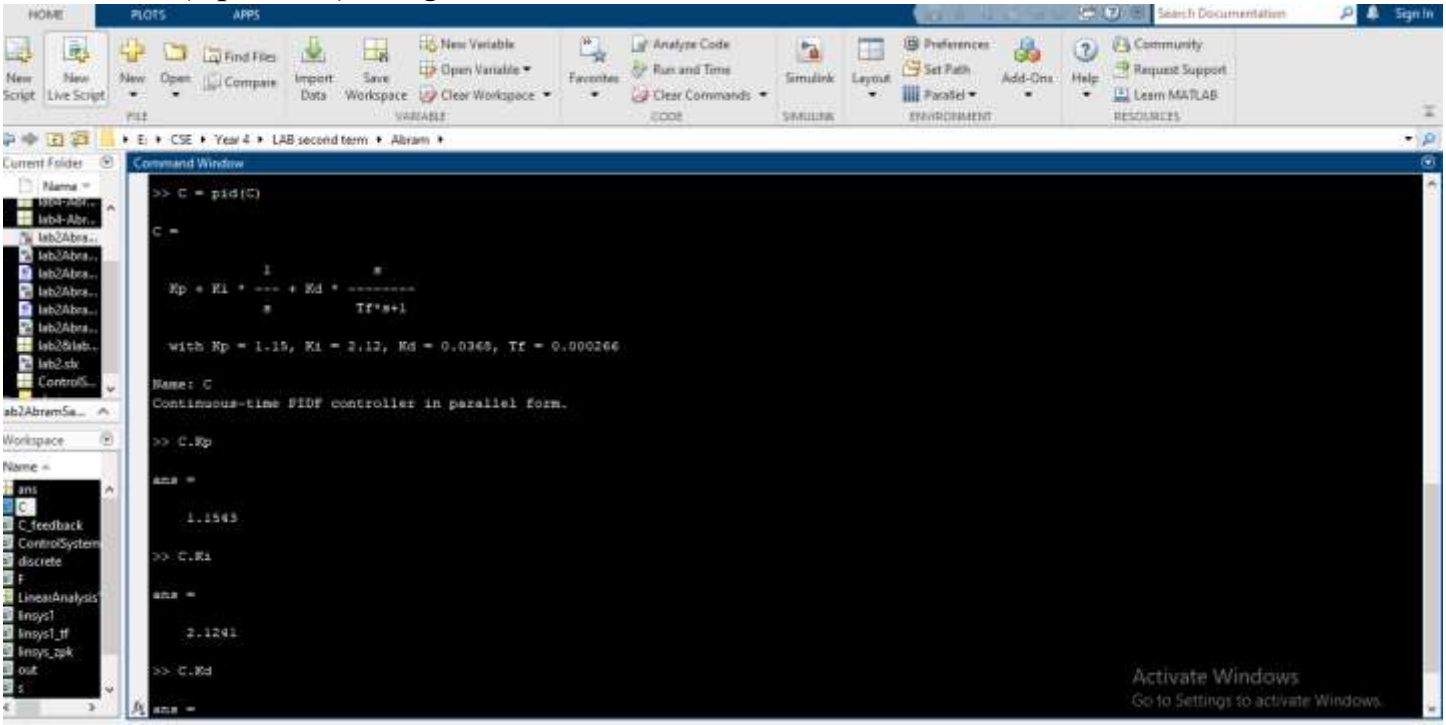
3. PID tuning

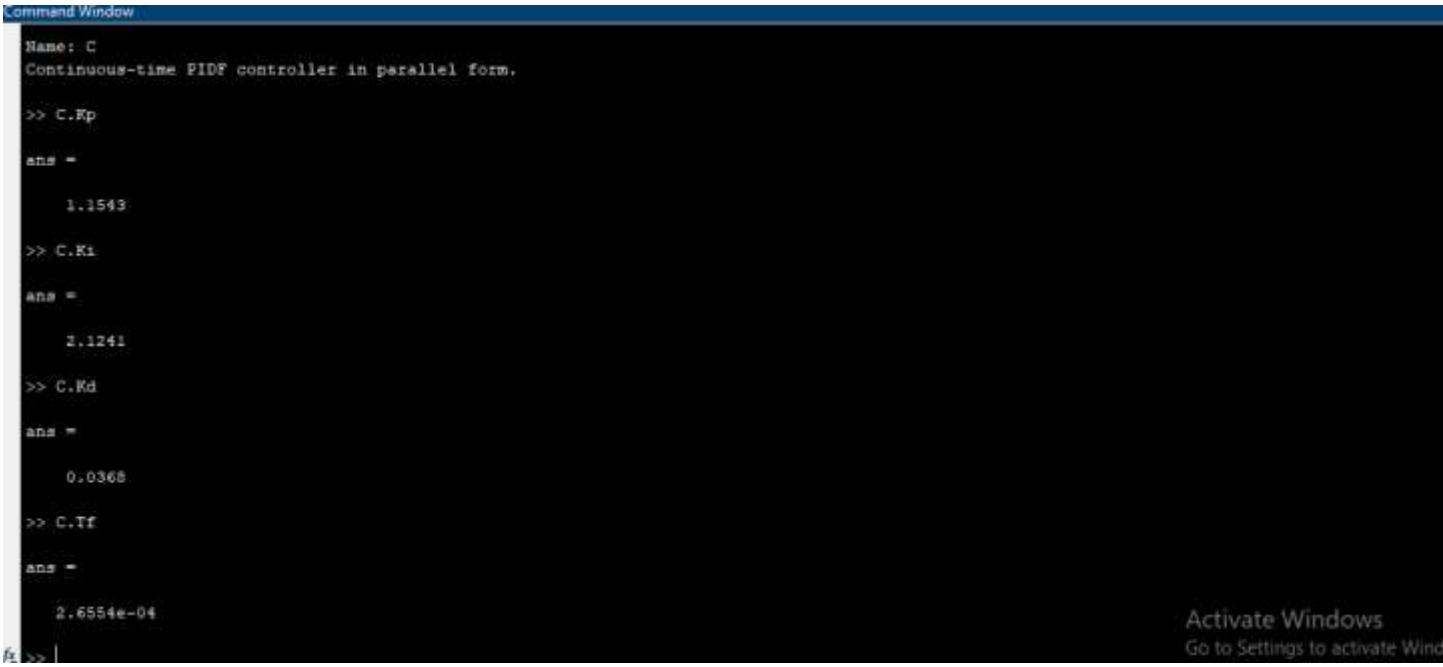


4. Export compensator (PID)



5. Parameters (Kp,Ki,Kd) using sisotool

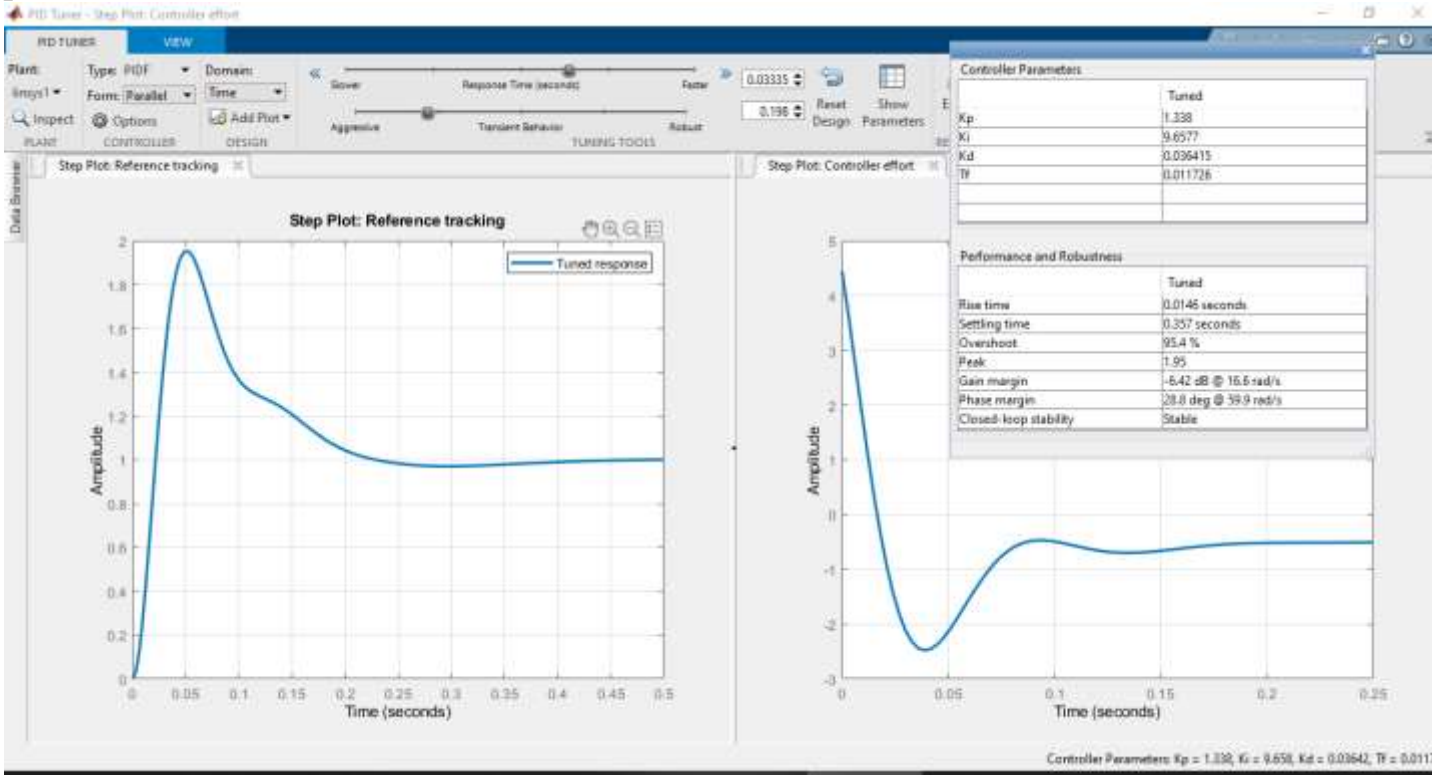



Command Window
Name: C
Continuous-time PIDF controller in parallel form.
>> C.Kp
ans =
1.1543
>> C.Ki
ans =
2.1241
>> C.Kd
ans =
0.0368
>> C.Tf
ans =
2.6554e-04
>>
Activate Windows
Go to Settings to activate Wind

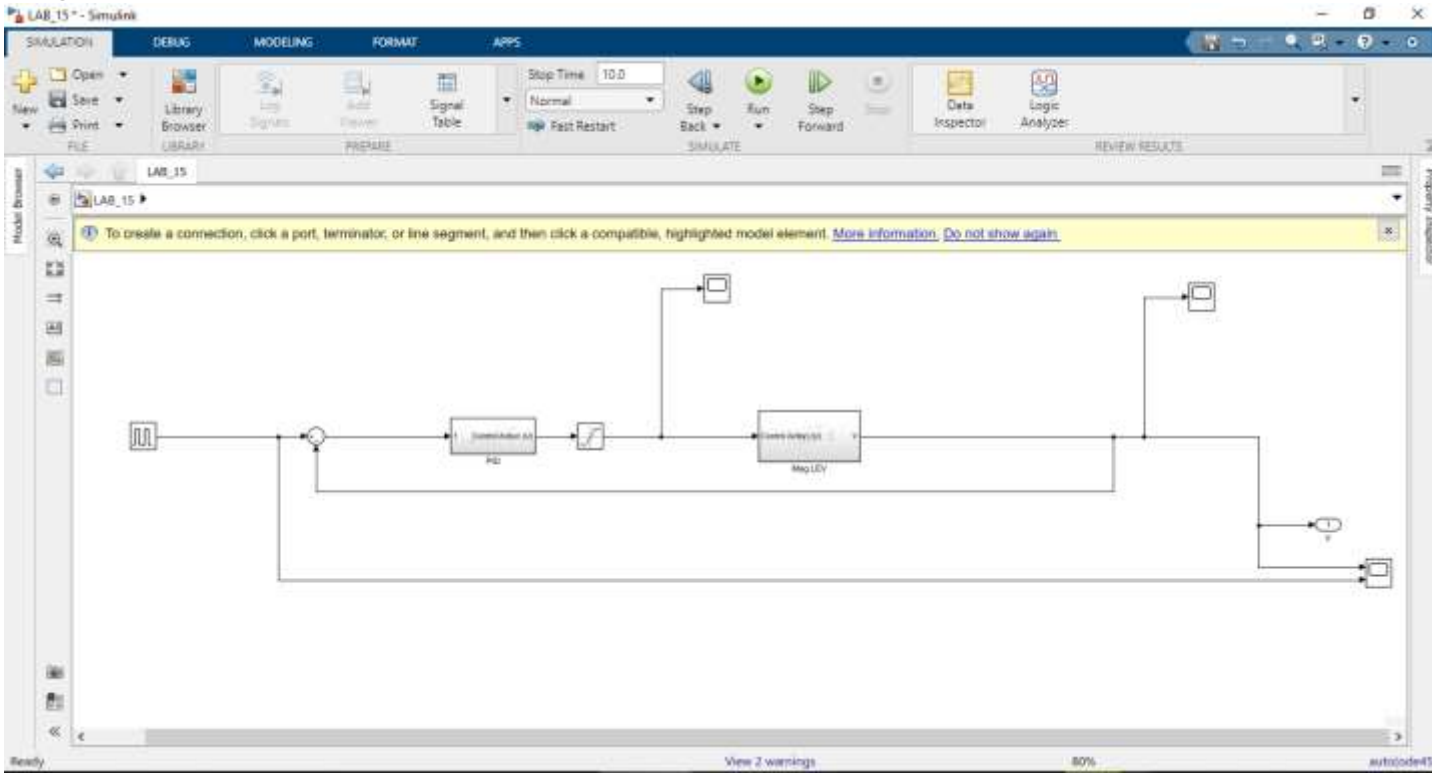
2- Design the PID controller for MagLev system using ***pidTuner*** tool then plot the step response and the control action of the controller. (Write the controller parameters and take screenshots for each step)

- Controller Parameters :-
  Kp = 1.338 , Ki=9.6577 ,Kd= 0.036415 , Tf= 0.011726

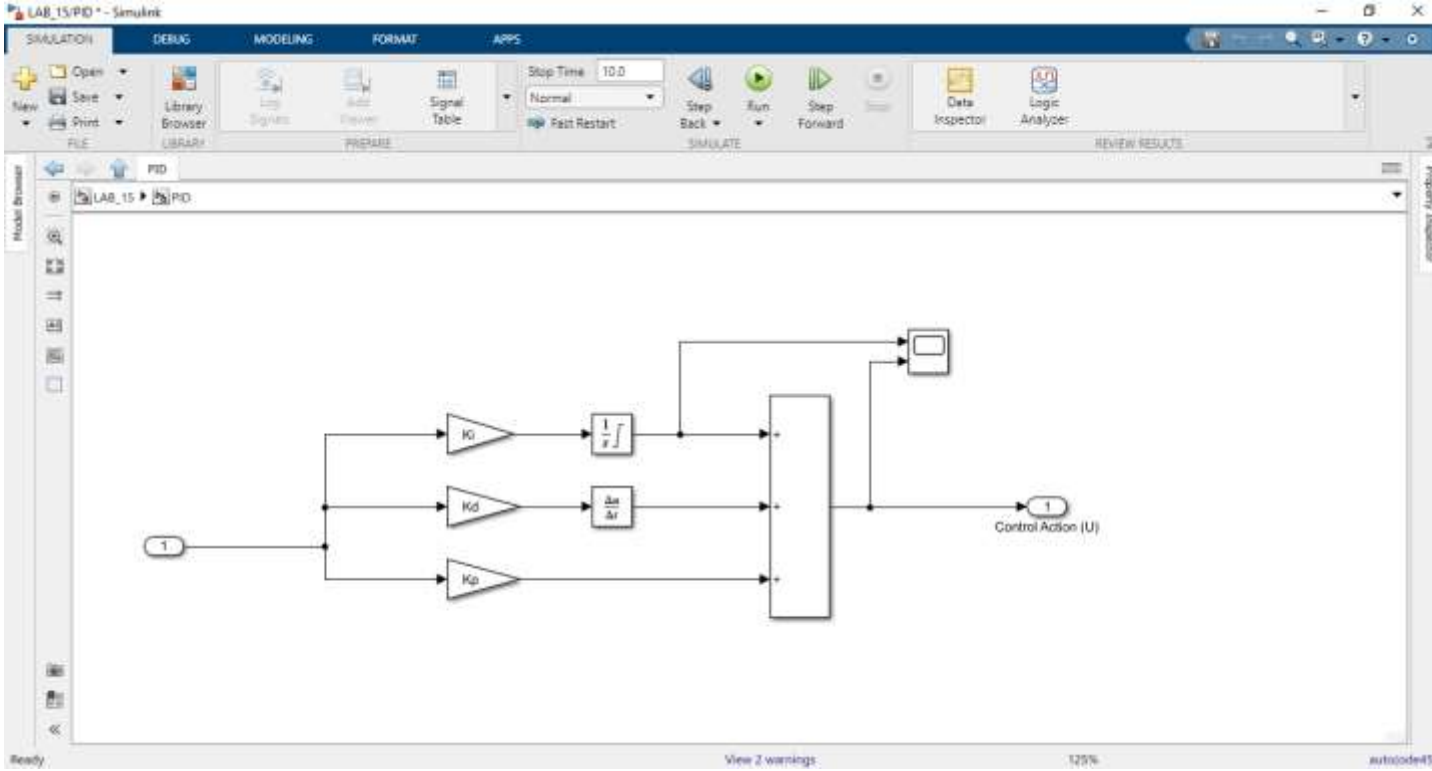
1. pidTuner toolbox



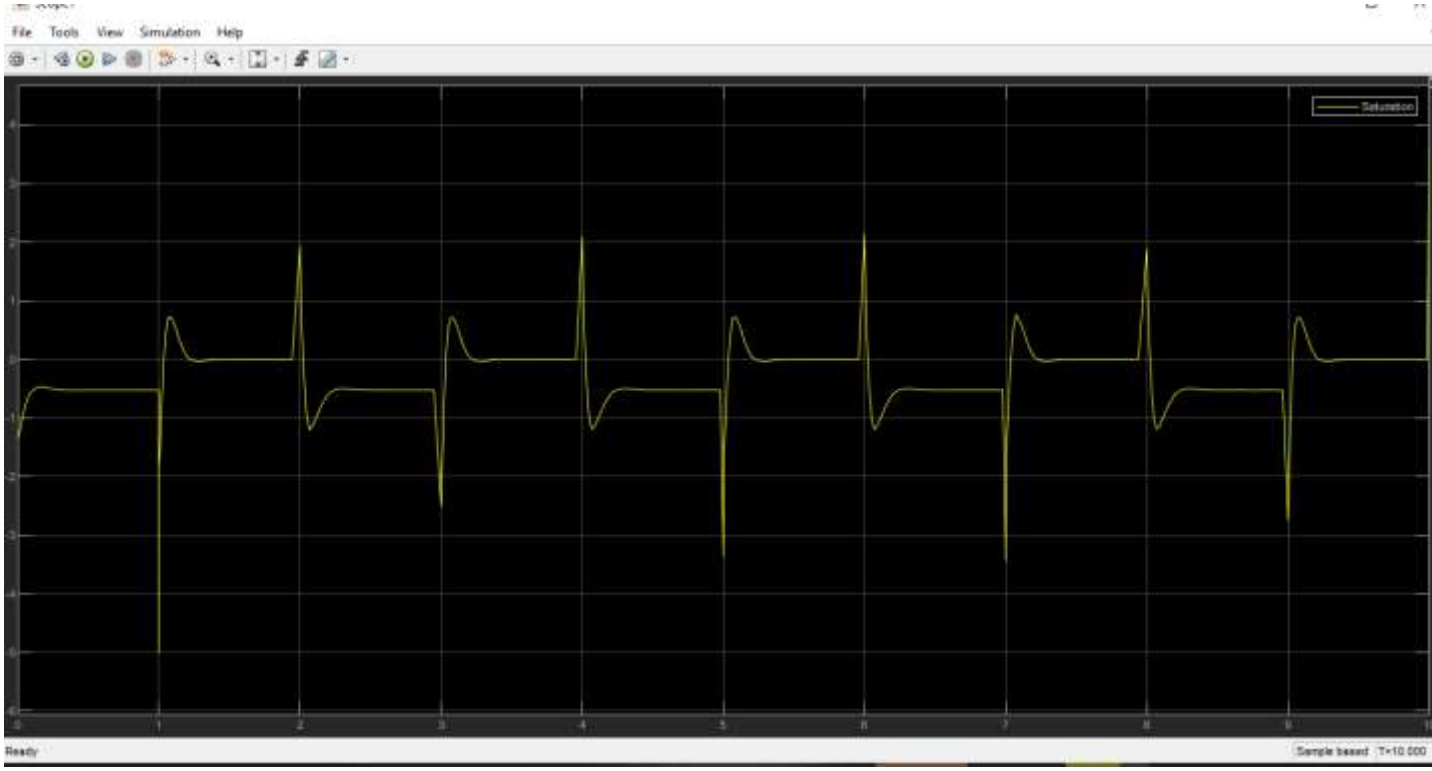
2. MagLev PID



3. PID compensator

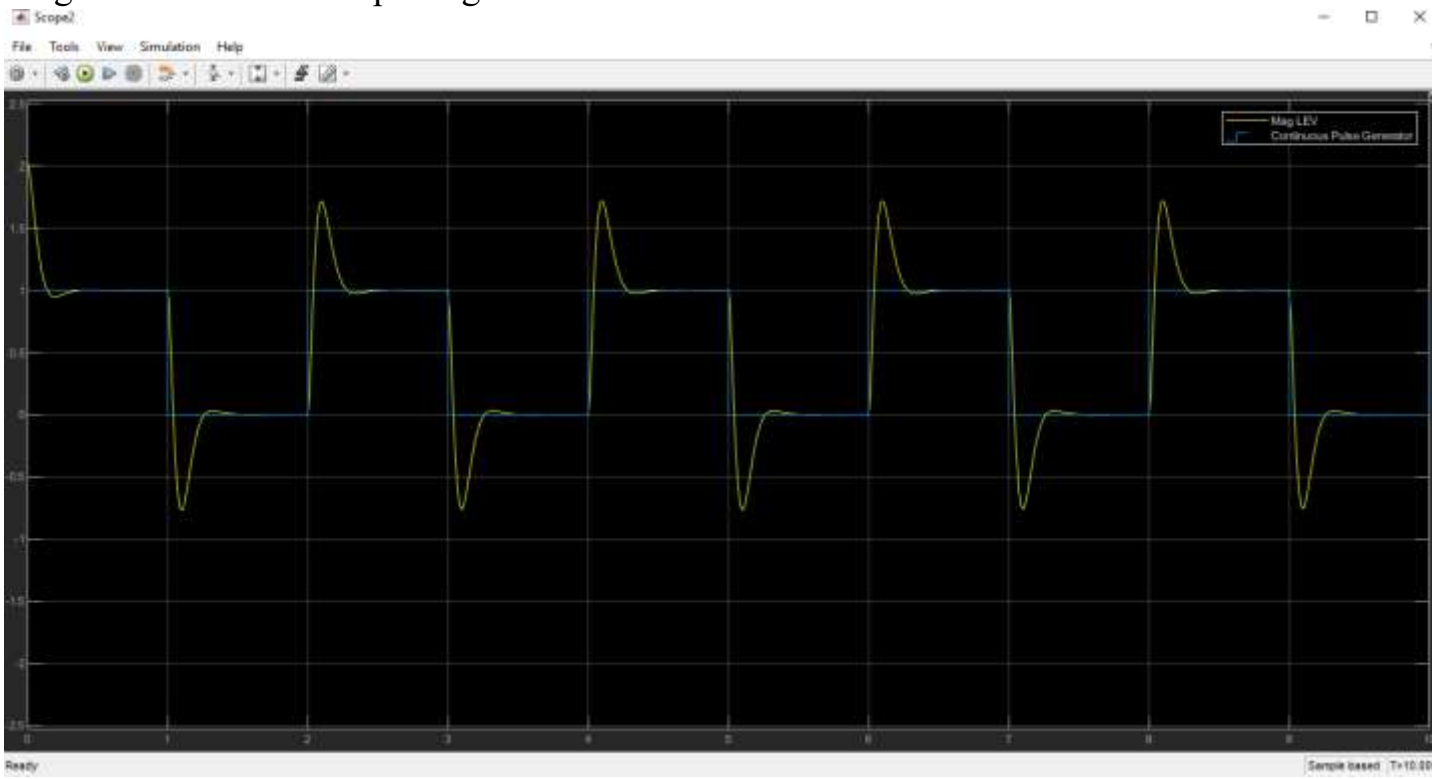


4. Control action after saturation

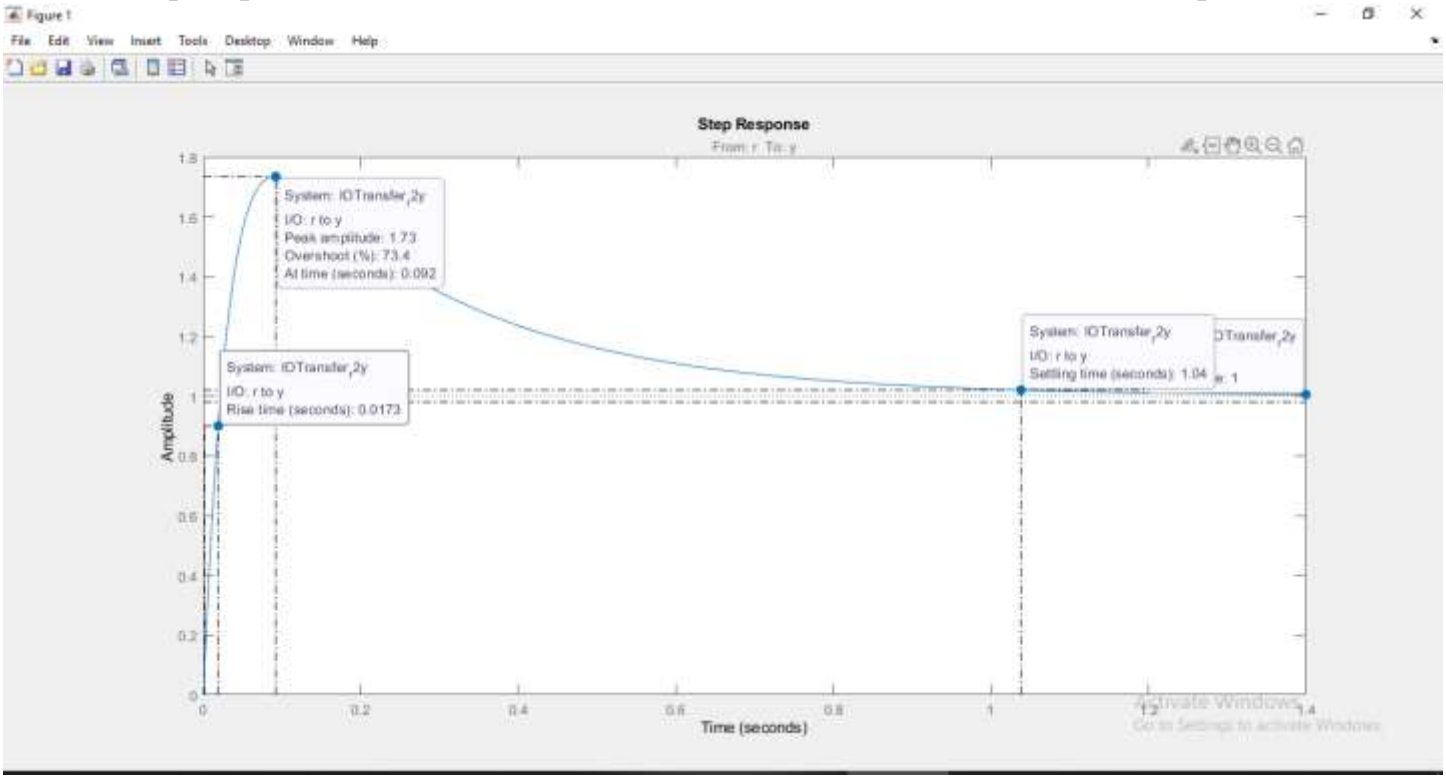


5. MagLev output

6. MagLev vs. Continuous pulse generator

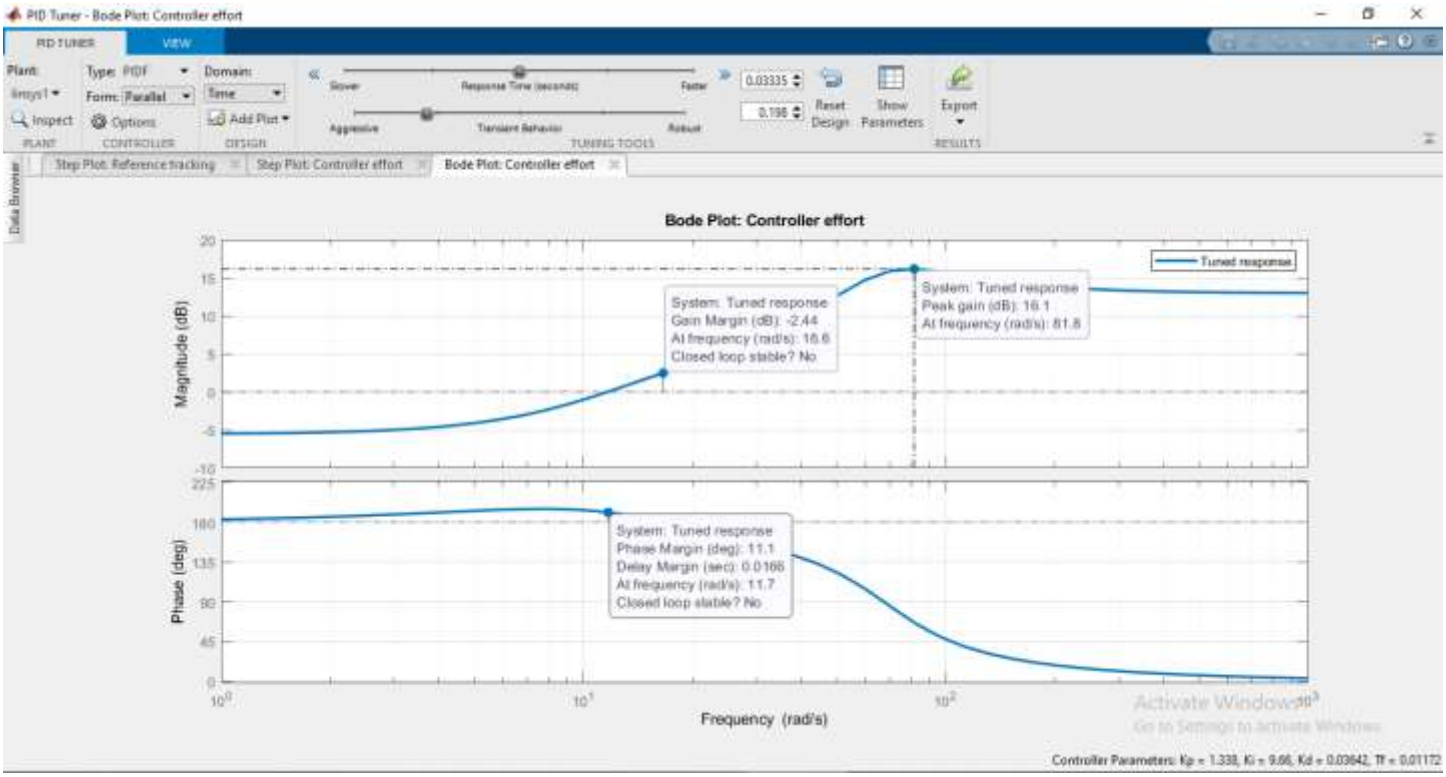


3- Plot the step response for the best controller and write the information of the response.



Rise time = 0.0173 sec.
Overshoot = 73.4%
Serrling time = 1.04 sec.
Final value = 1

4- Repeat (3) for the bode diagram.



Phase Margin = 11.1 deg

Gain margin = -2.44 dB