

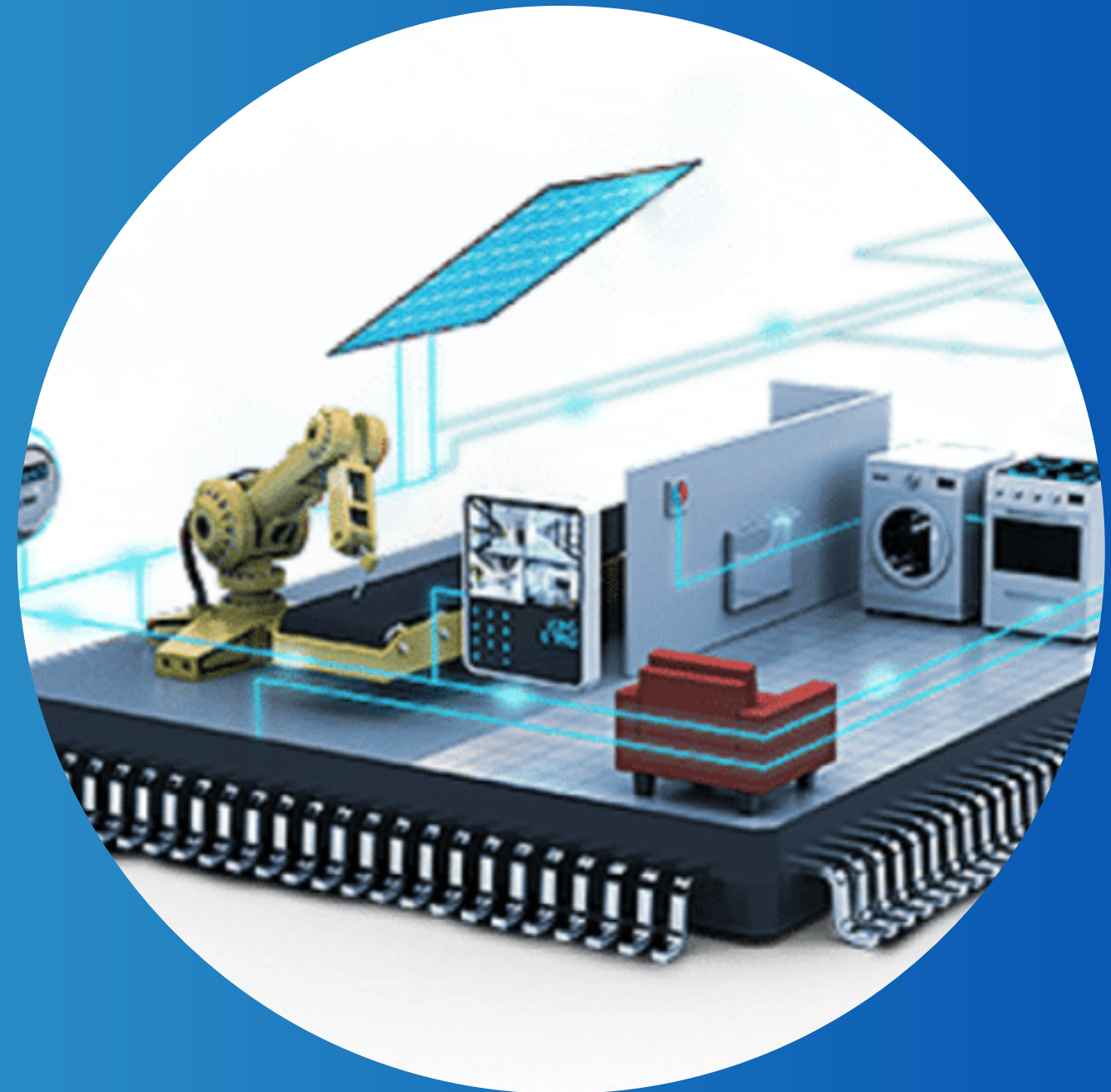
# Trabalho Controle Clássico

Grupo 9

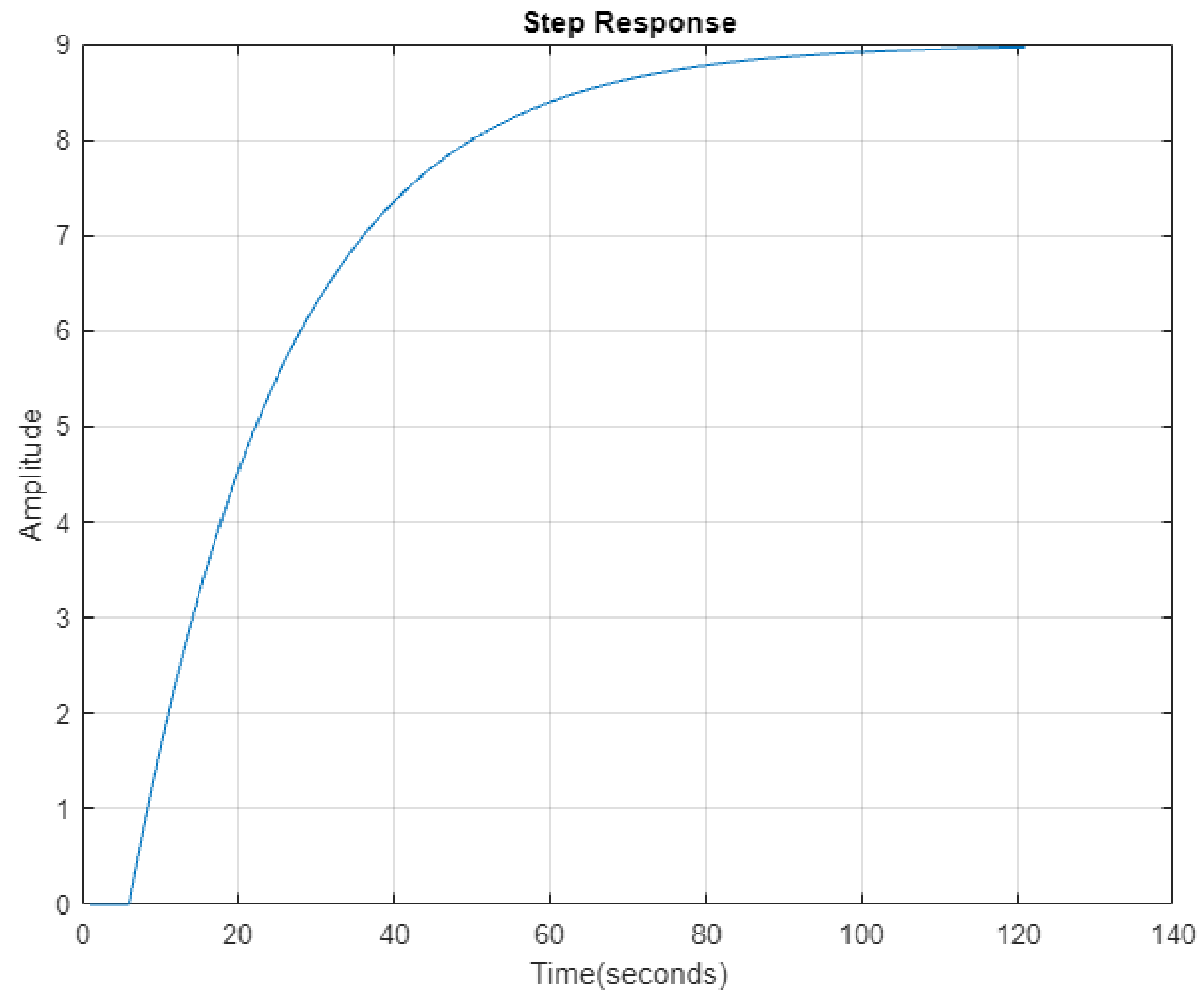
Igor Luiz Rodrigues

Rafaela Fernandes Machado

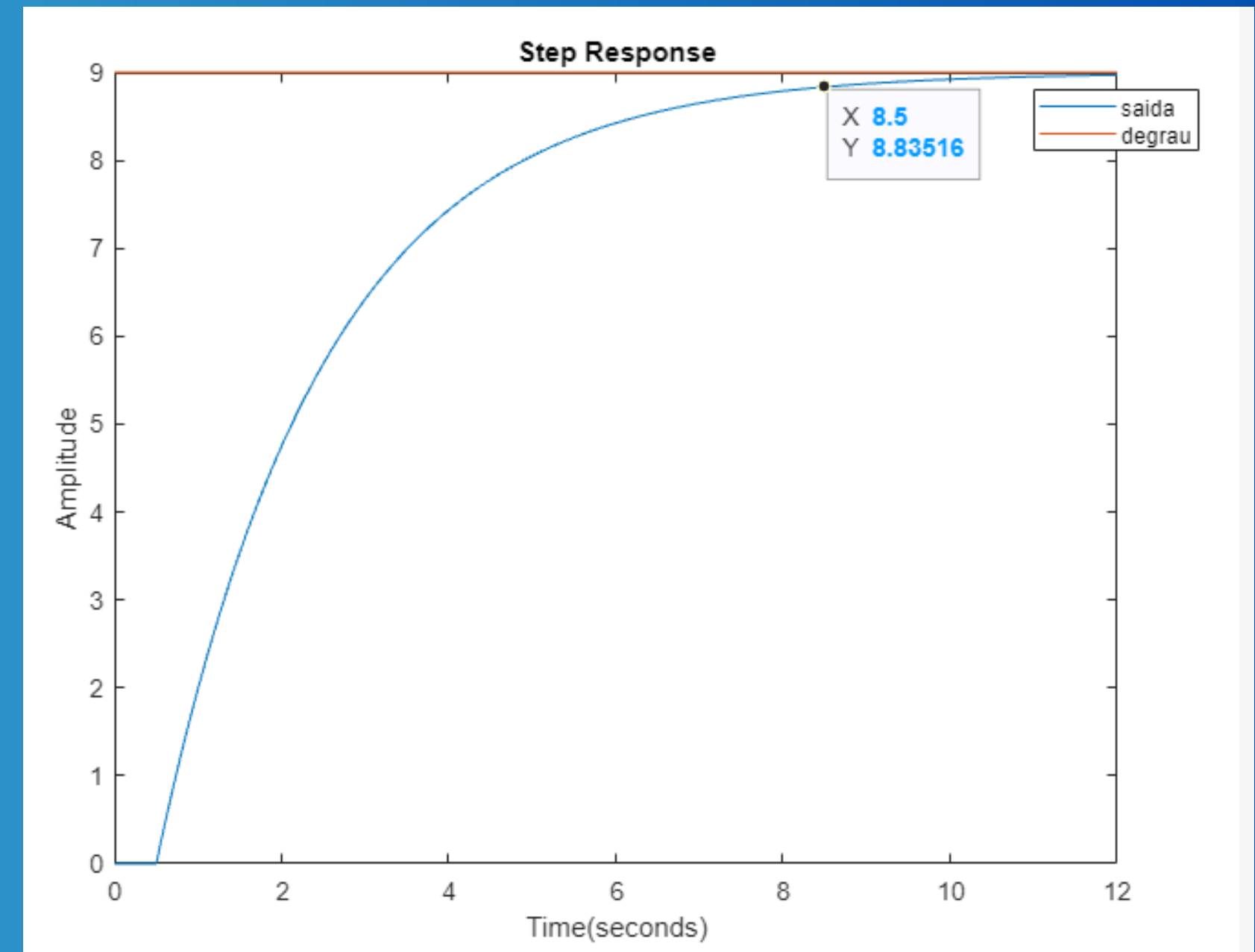
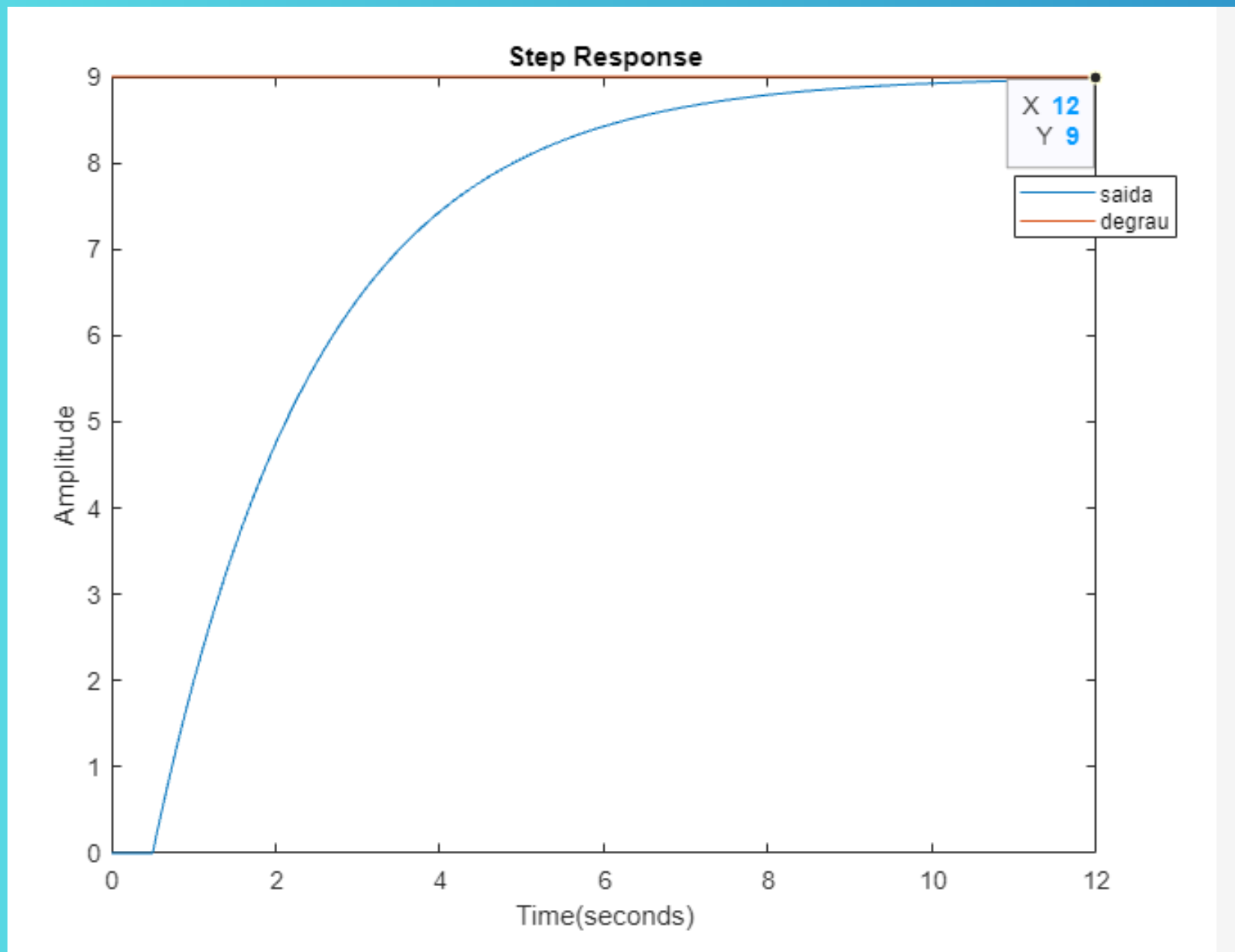
Rodrigo Paiva de Oliveira



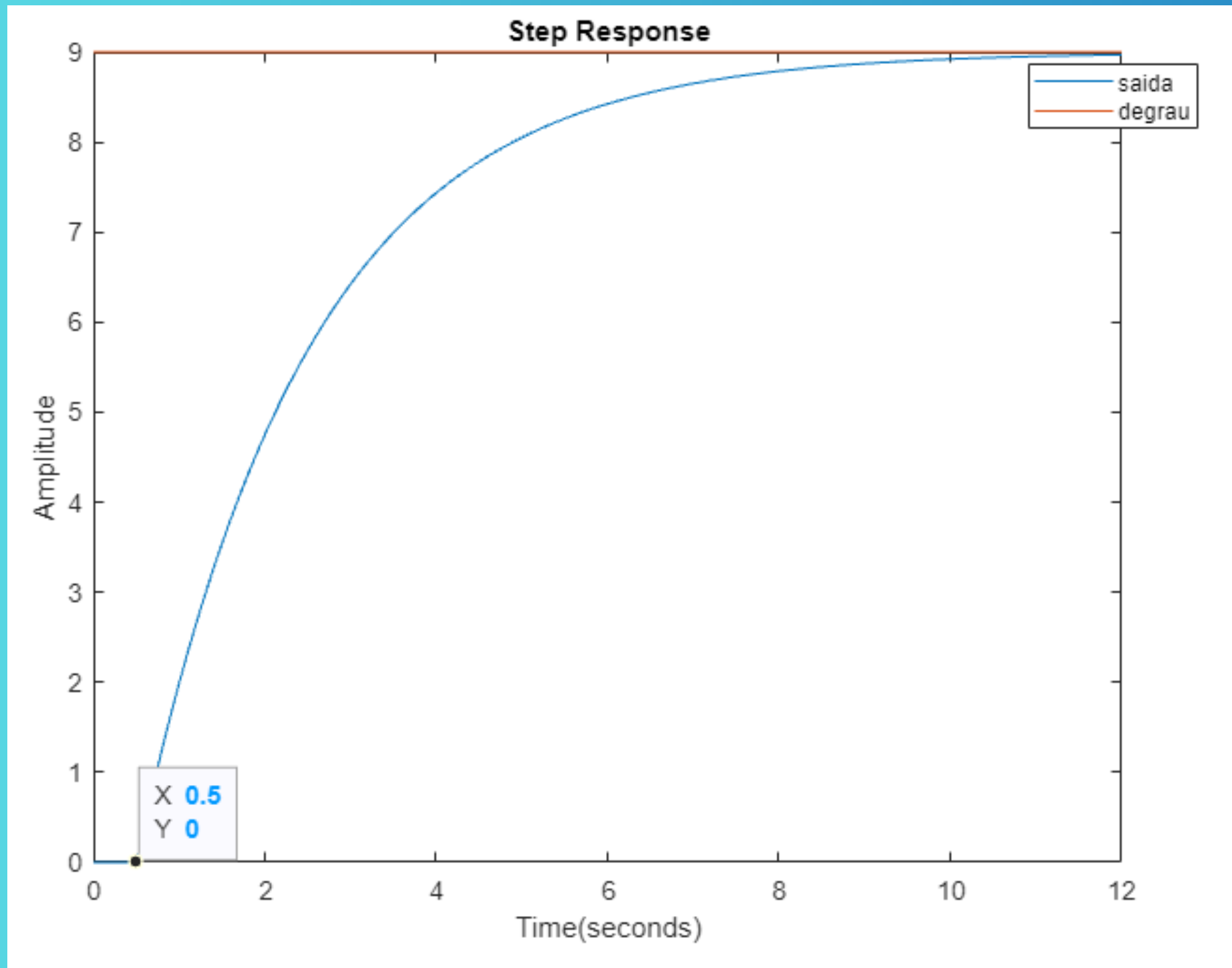
# Gráfico



# Método de identificação da planta:



# Método de Localização:



$$K = 9/9 = 1$$

$$t_a = 4\tau \rightarrow 98,2\% * 9$$

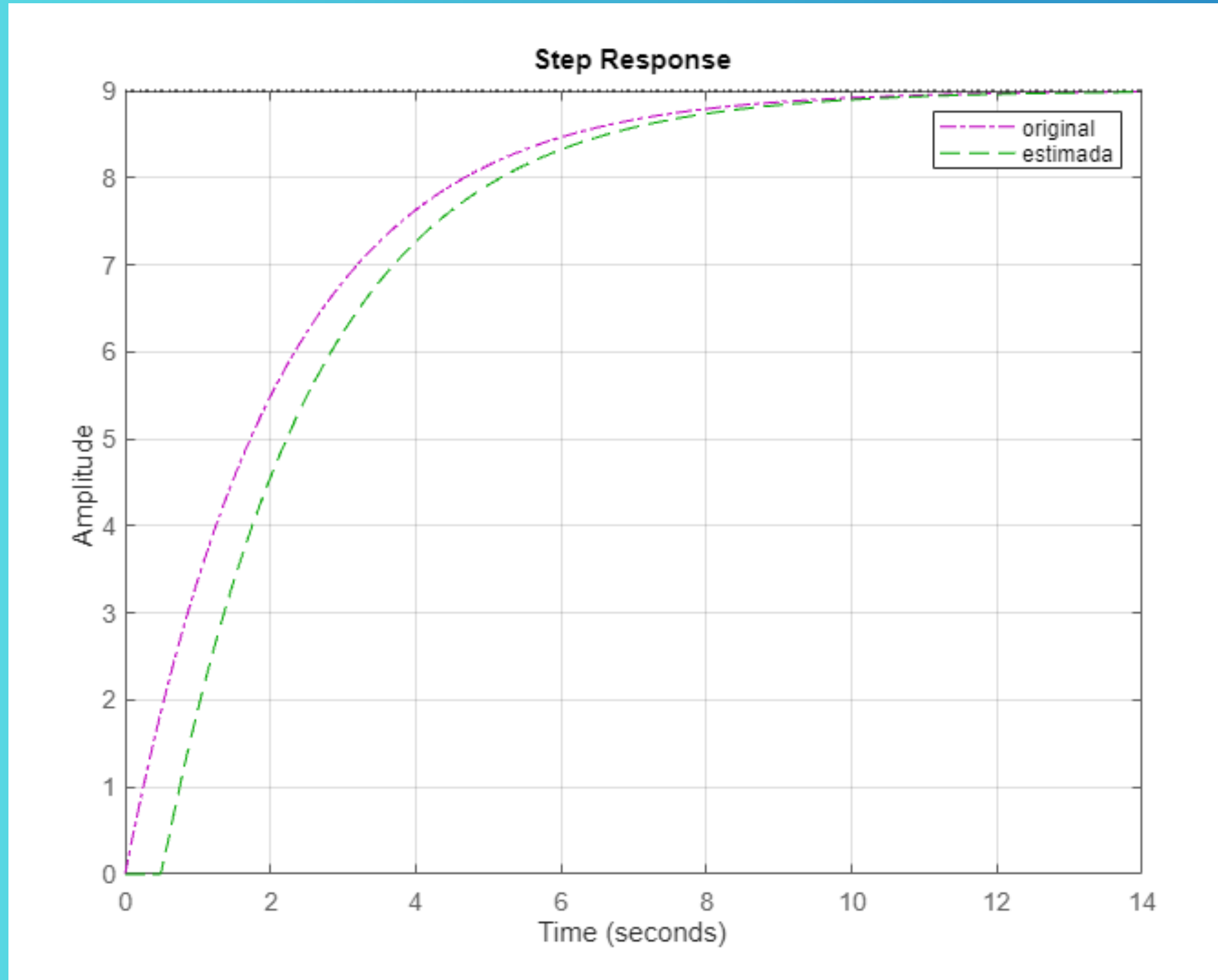
$$t_a = 8.5/4$$

$$\tau = 2.125 \text{ s}$$

$$\theta = 0.5 \text{ s}$$

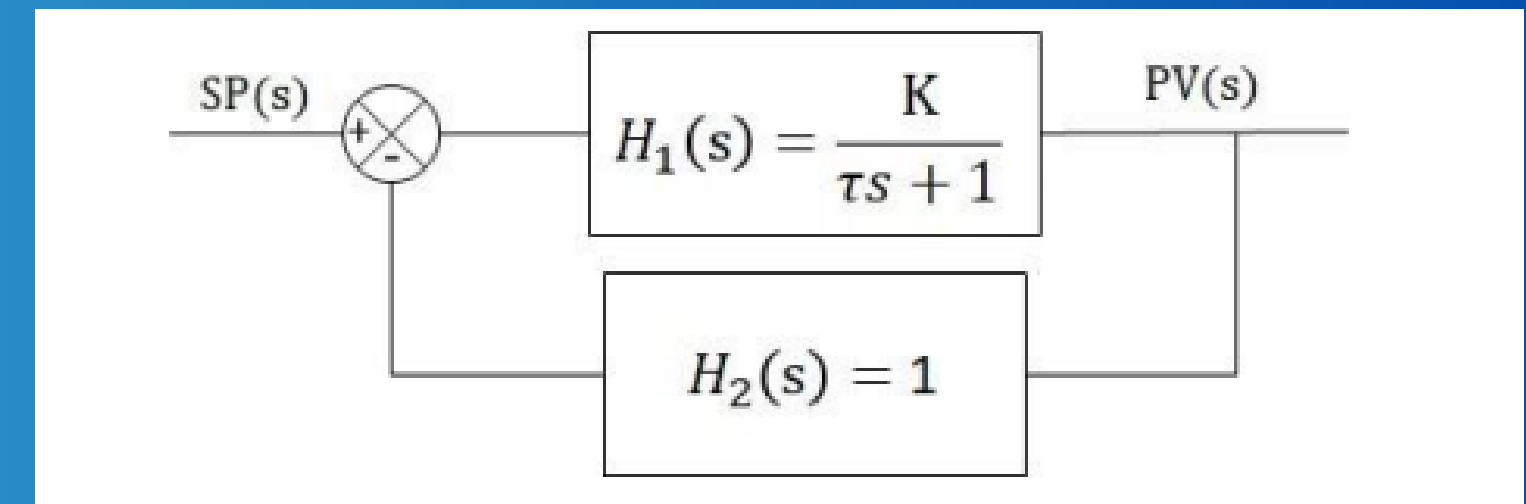
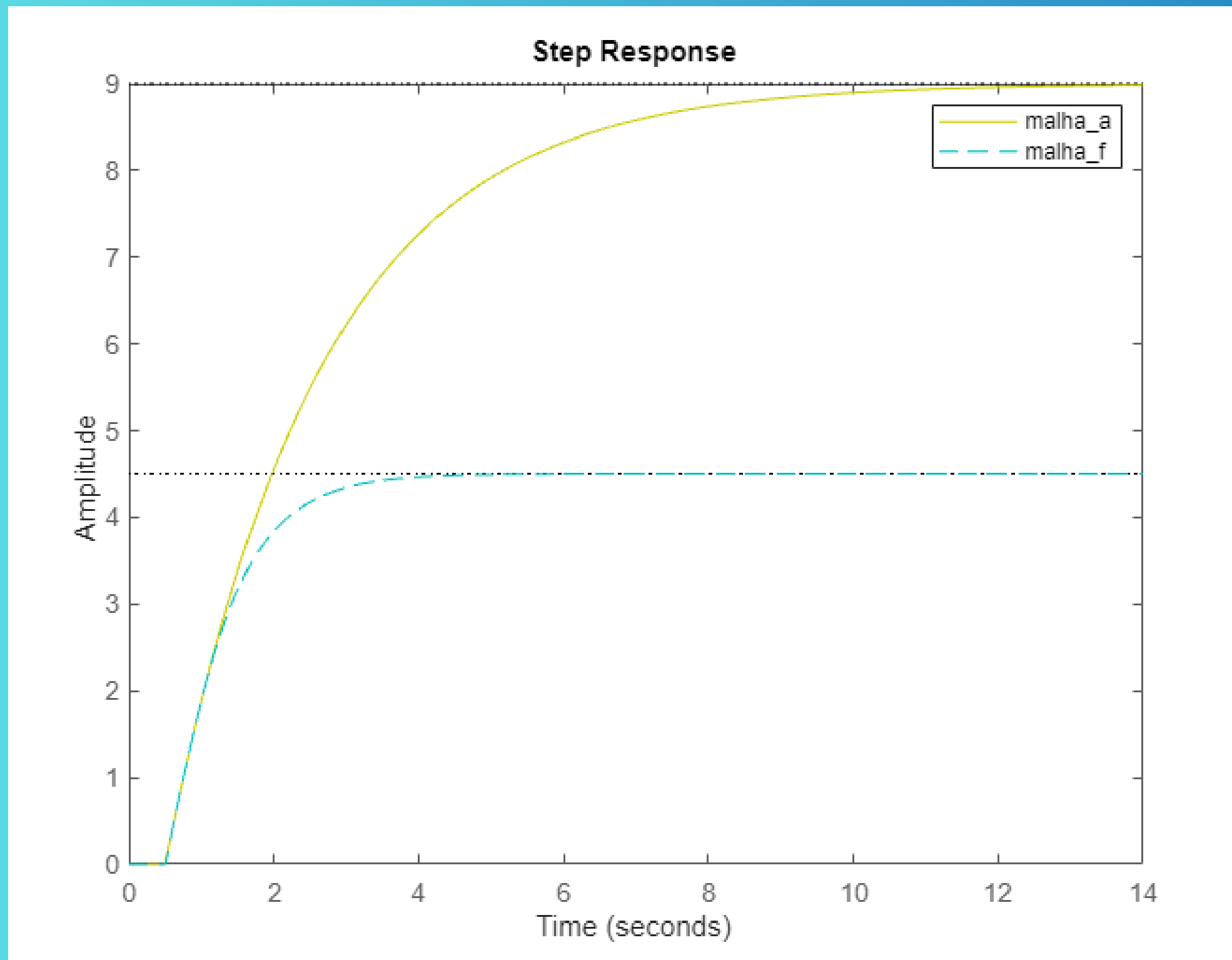
# Original em relação a estimada:

## Plotando os gráficos:



```
>> sys = tf([1], [2.125 1])  
sys_atraso = tf([1], [2.125 1])  
set(sys_atraso, 'InputDelay',0.5)  
sys_atraso  
step(sys*9,'m-.',sys_atraso*9,'g--')  
legend('original','estimada')
```

# Valores de erro planta aberta e fechada:



```
>> sys_aberto = sys_atraso|  
sys_fechado = feedback(sys_aberto,1)  
step(sys_aberto*9, 'y-', sys_fechado*9, 'c--')  
legend('malha_a', 'malha_f')
```

# Calculando Controlador CHR PID

→ CHR sem Sobrevalor:

$$K_p = (0.6 * \tau) / (K * \Theta)$$

$$K_p = (0.6 * 2.125) / (1 * 0.5)$$

$$K_p = 2.55$$

$$T_i = \tau$$

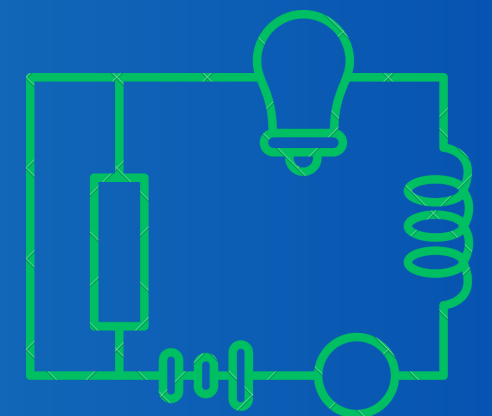
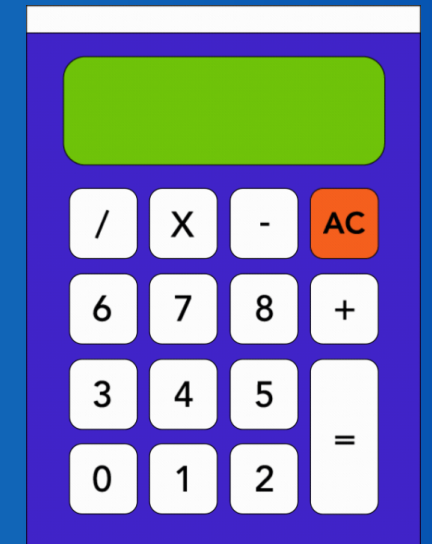
$$\tau = 2.125$$

$$T_i = 2.125$$

$$T_d = 0.5 * \Theta$$

$$T_d = 0.5 * 0.5$$

$$T_d = 0.25$$





# Calculando Controlador CHR PID

→ Método Cohen e Coon para Curva de Reação:



$$K_c = (1/K) * (\tau/\Theta) * [(4/3) + (1/4) * (\Theta/\tau)]$$

$$K_c = (1/1) * (2.125/0.5) * [(4/3) + (1/4) * (0.5/2.125)]$$

$$K_c = 5.916$$

$$T_i = \Theta * [(32 + 6 * (\Theta/\tau)) / (13 + 8 * (\Theta/\tau))]$$

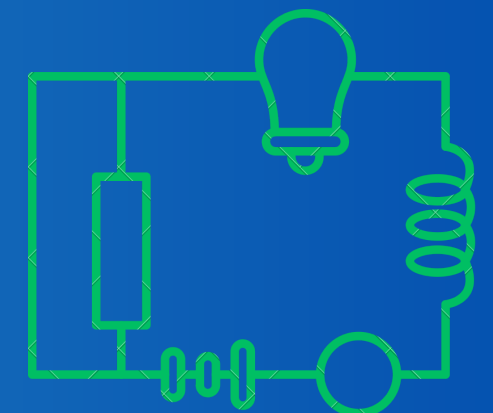
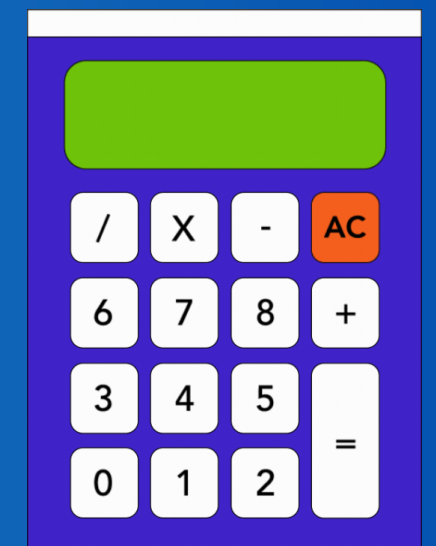
$$T_i = 0.5 * [(32 + 6 * (0.5/2.125)) / (13 + 8 * (0.5/2.125))]$$

$$T_i = 1.122$$

$$T_d = \Theta * [(4) / (11 + 2 * (\Theta/\tau))]$$

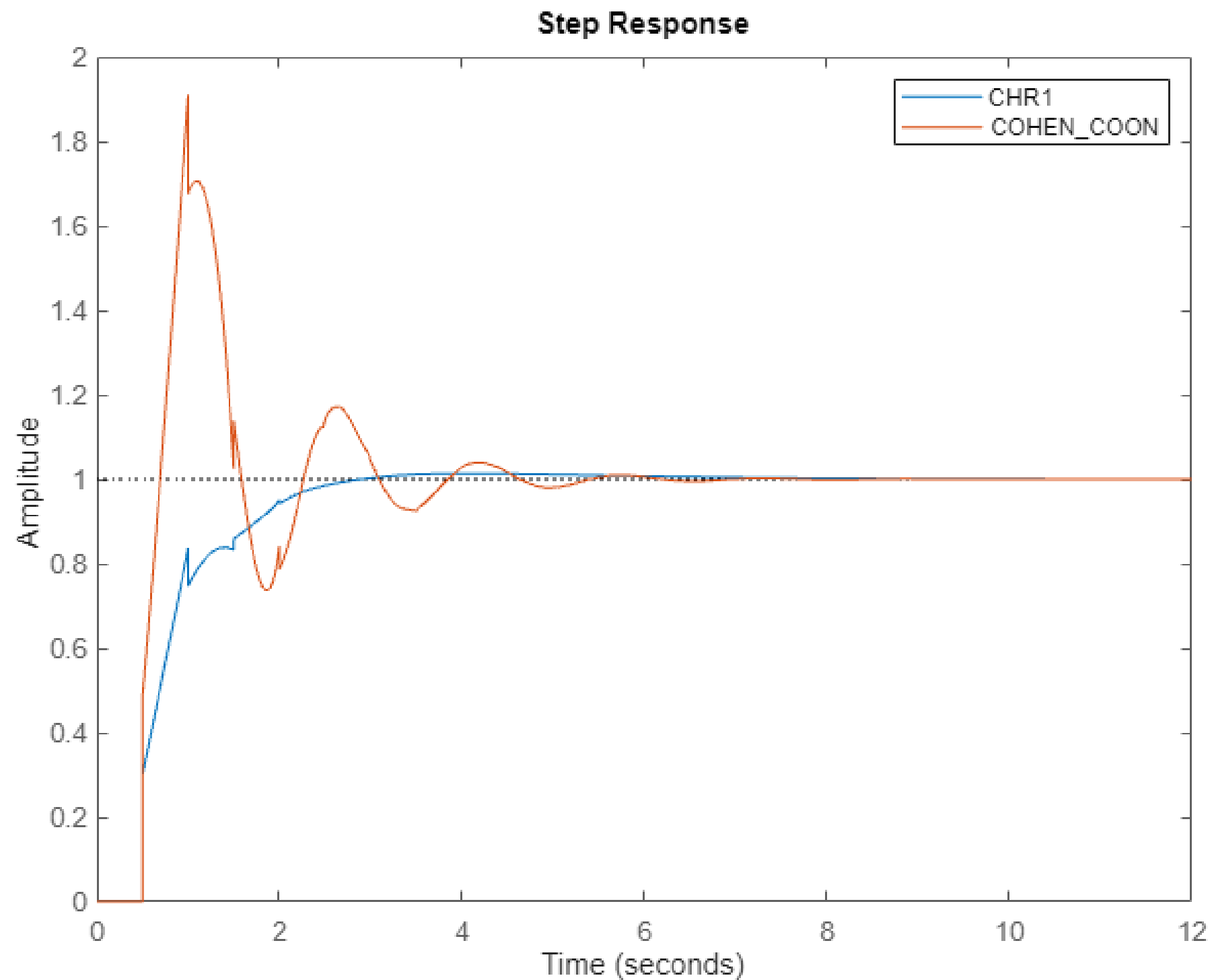
$$T_d = 0.5 * [(4) / (11 + 2 * (0.5/2.125))]$$

$$T_d = 0.174$$





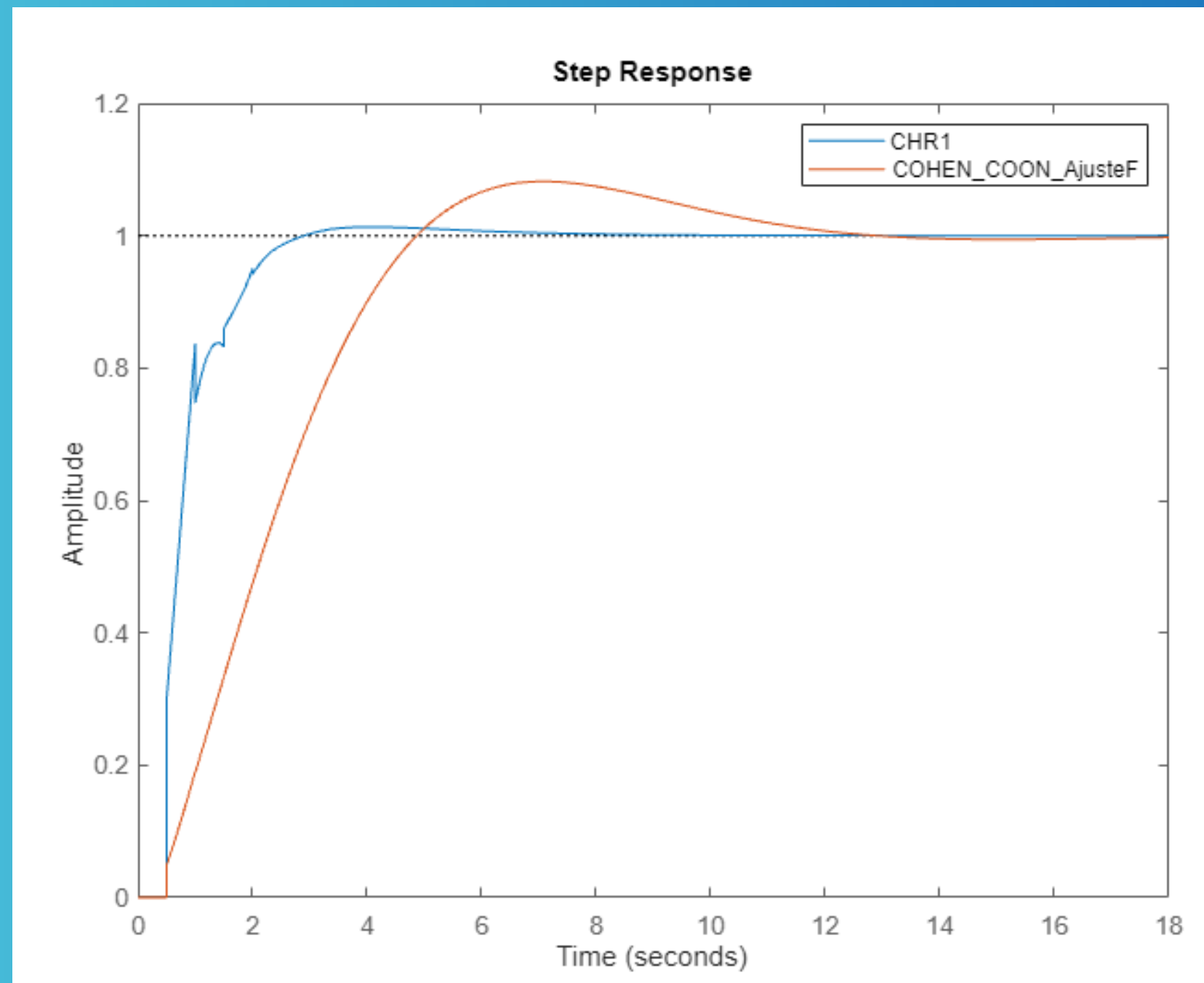
# Plotando o gráfico do controlador



```
>> func = tf([1], [2.125 1], 'InputDelay', 0.5);  
>> PIDCHR1 = pidstd(2.55, 2.125, 0.25);  
PIDCOHEN_COON = pidstd(5.916, 1.122, 0.174);  
resposta_CHR1 = feedback(func * PIDCHR1, 1);  
resposta_COON = feedback(func * PIDCOHEN_COON, 1);  
hold on  
grid on  
step(resposta_CHR1, resposta_COON)  
legend('CHR1', 'COHEN_COON')
```

# Plotando o gráfico com ajuste fino

Como o Cohen\_Coon está com o overshoot muito alto (próximo de 90%) diminuámos o  $K_c$  do Cohen\_Coon em 10 vezes ( $K_c = 0.5916$ ).



# Considerações dos métodos

