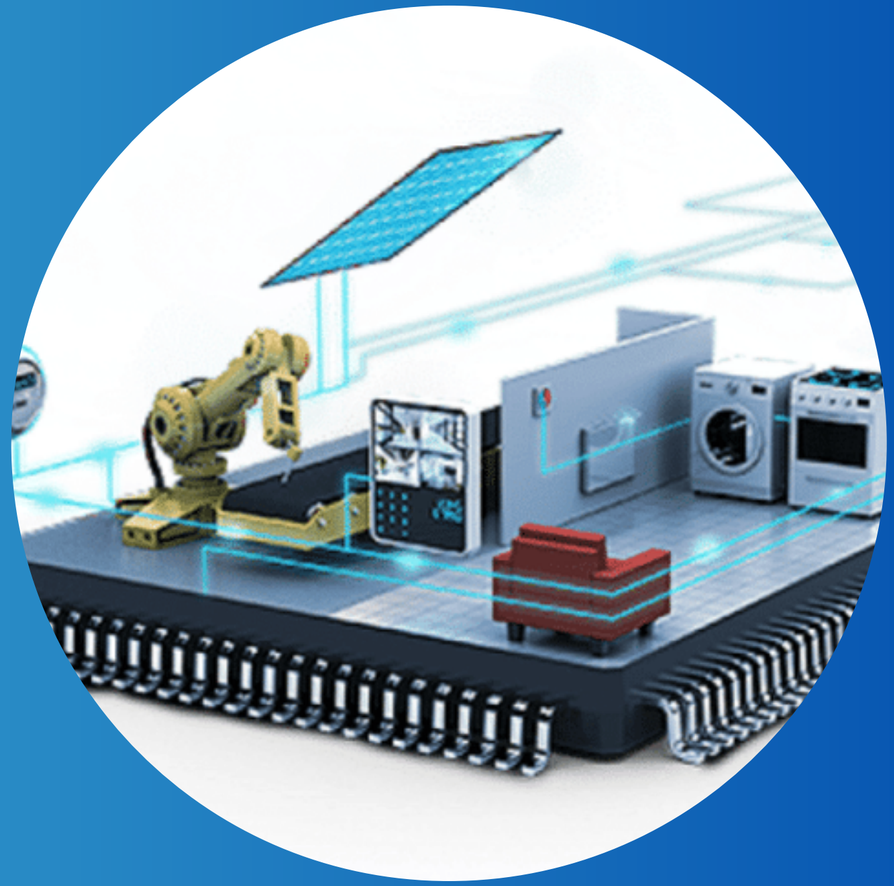
Trabalho Controle Clássico



Grupo 9

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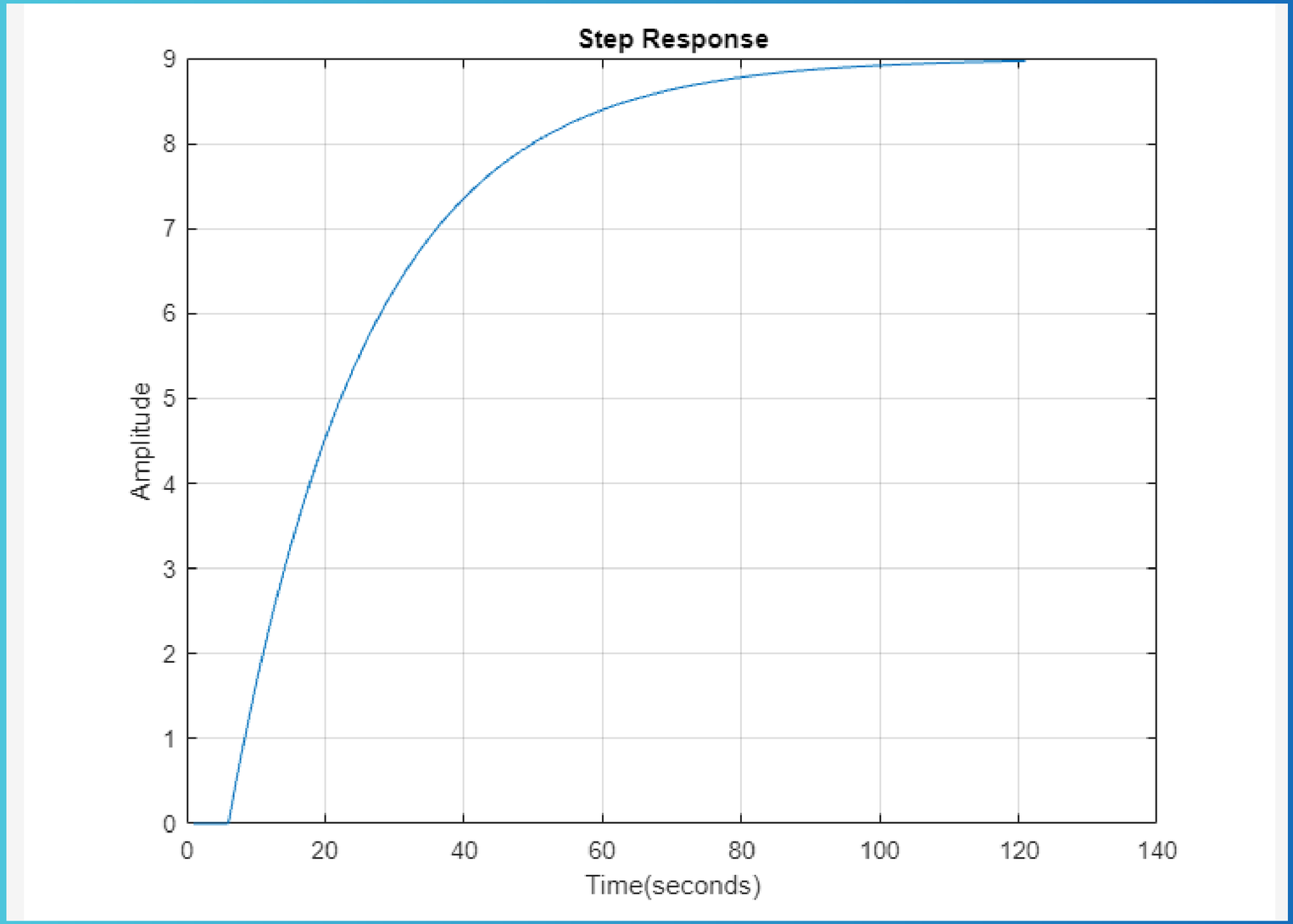
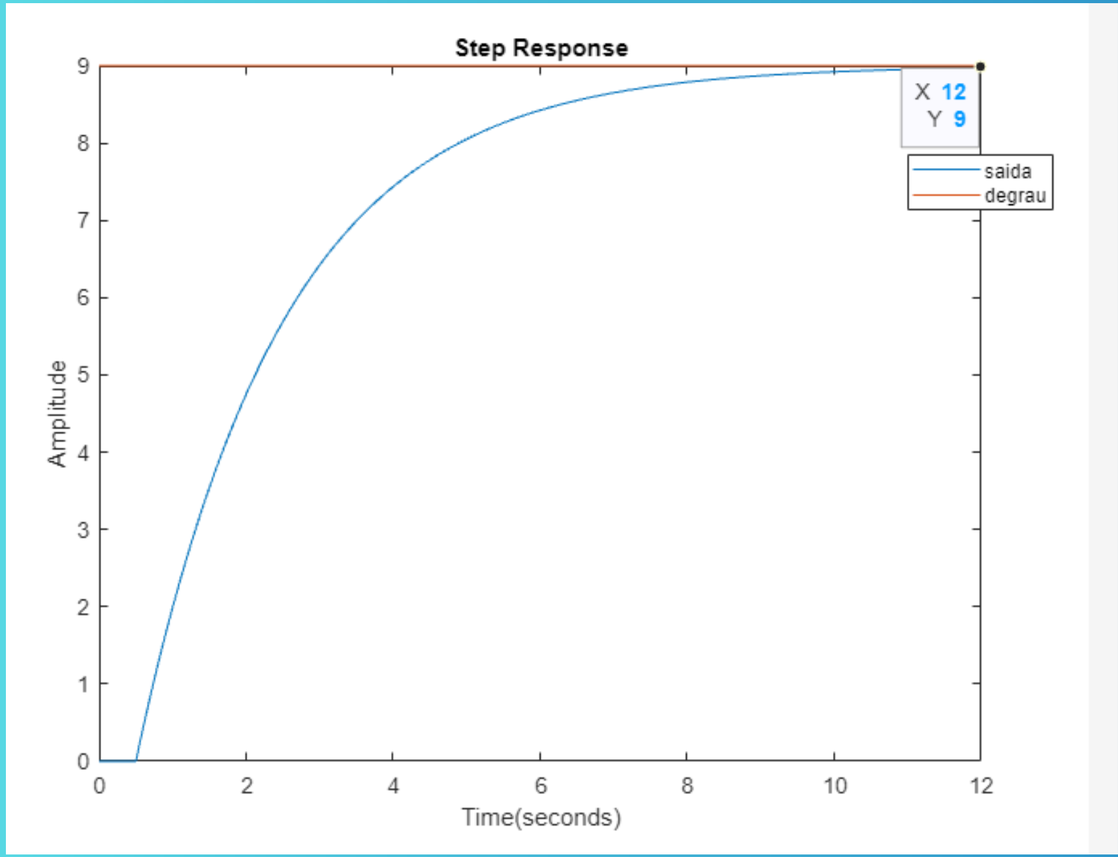
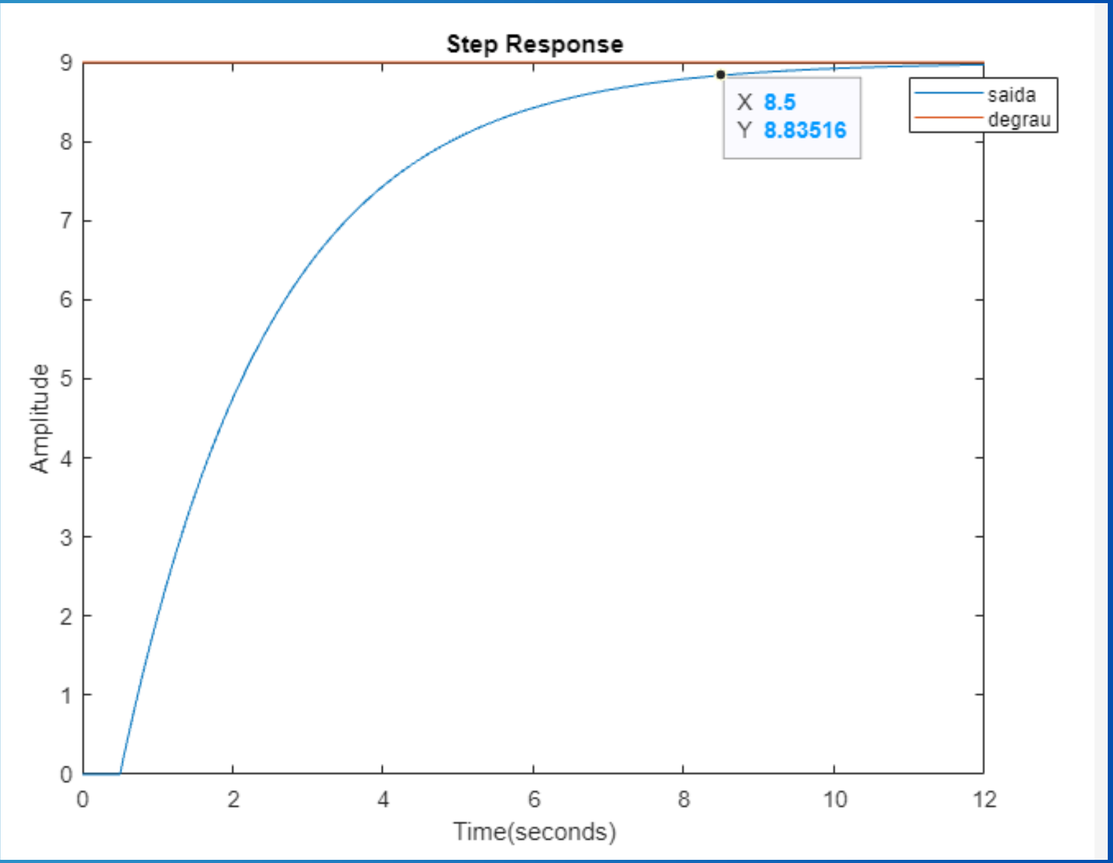
Gráfico

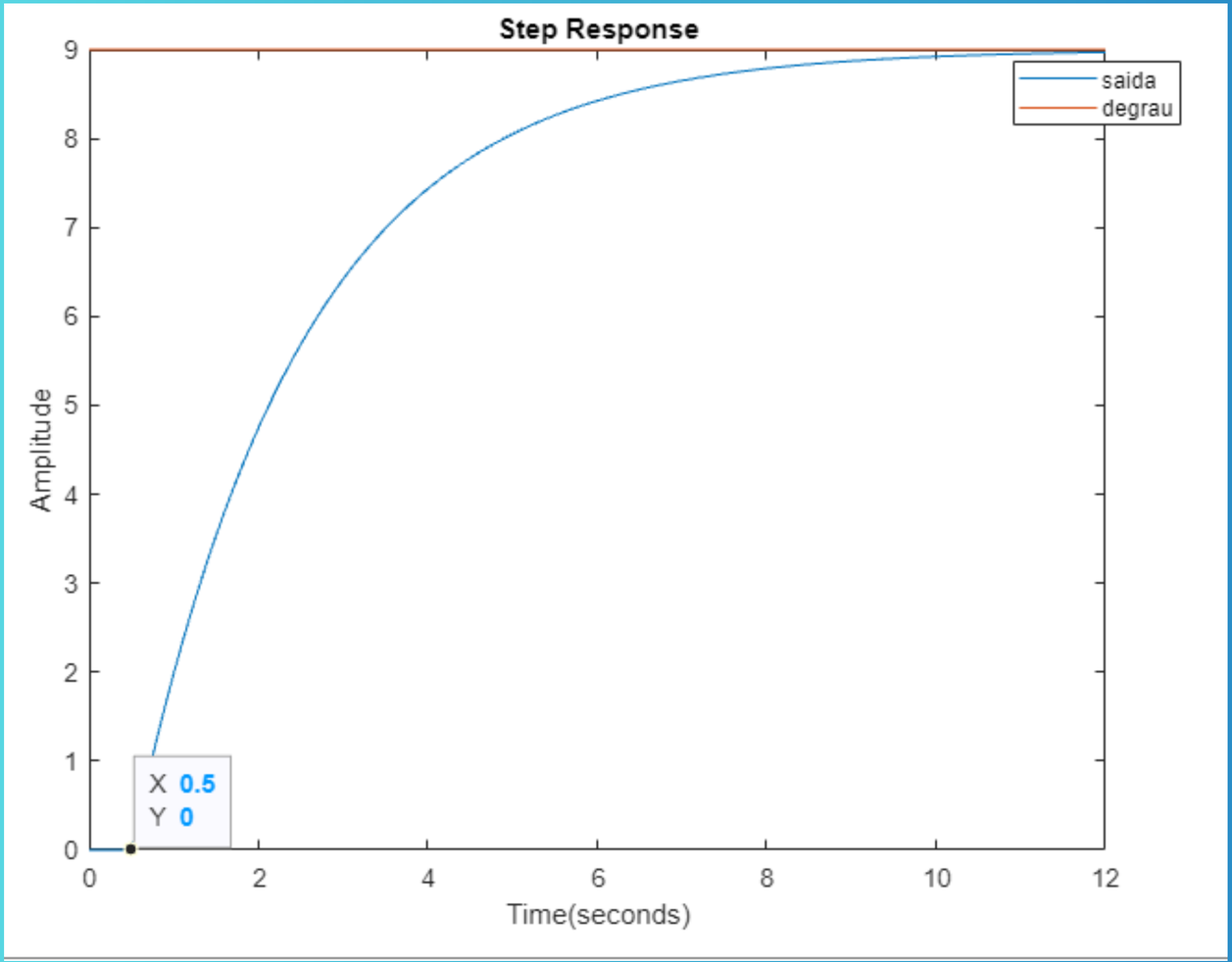

Step Response
Amplitude
Time(seconds)
0
1
2
3
4
5
6
7
8
9
0
20
40
60
80
100
120
140

Método de identificação da planta:





Método de Localização:



K = 9/9 = 1

ta = 4tau -> 98,2% * 9

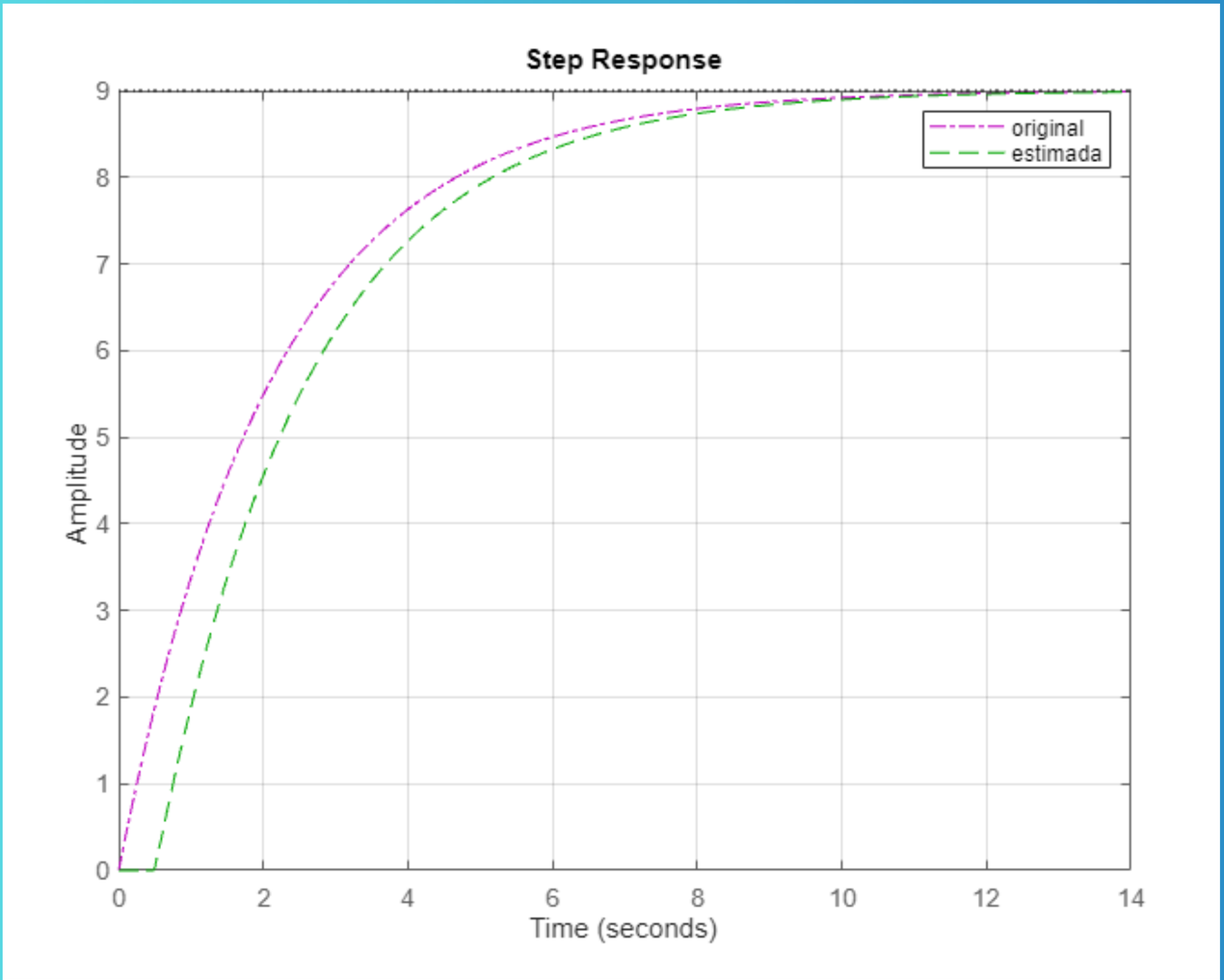
ta = 8.5/4

τ = 2.125 s

Θ = 0.5 s

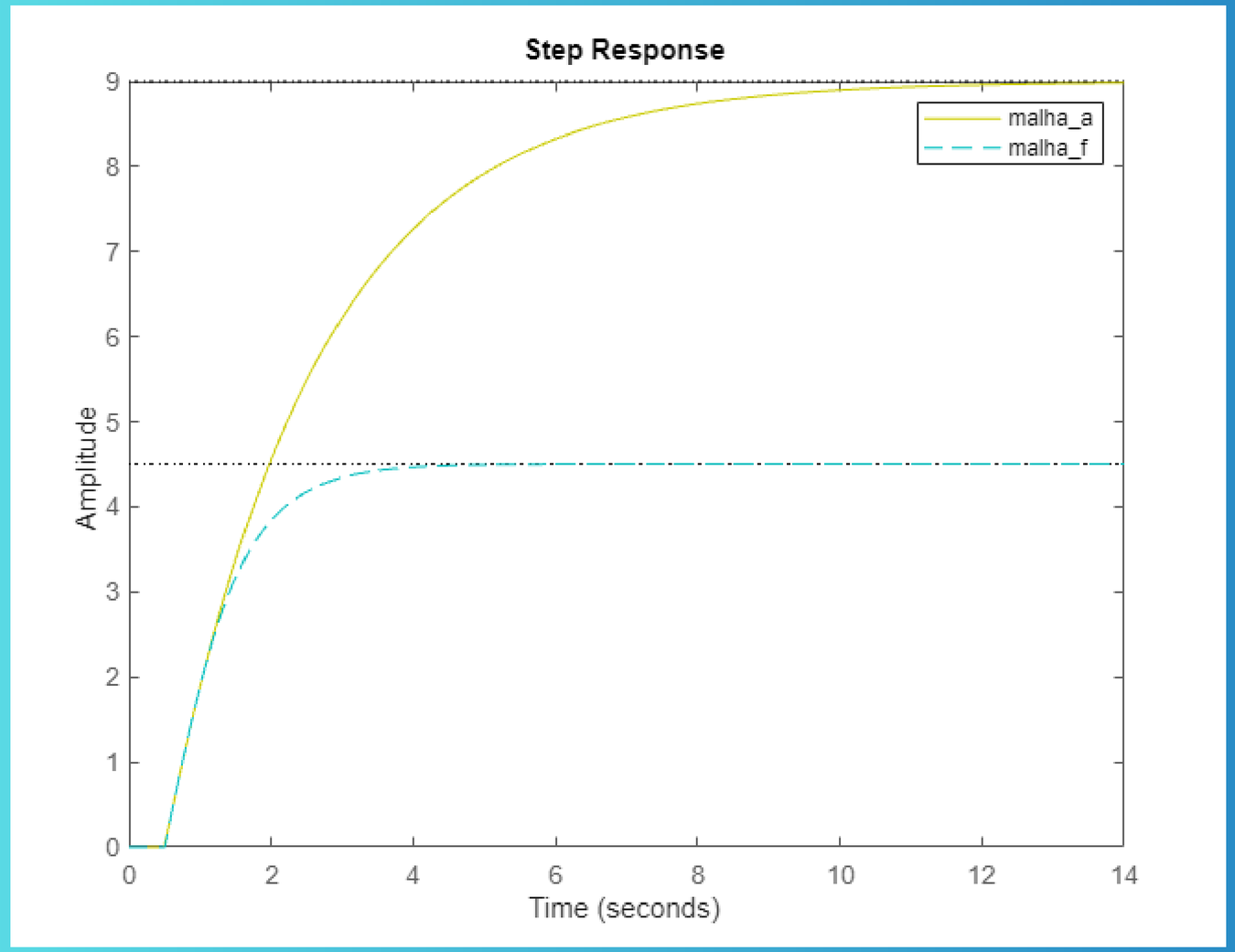
Original em relação a estimada:

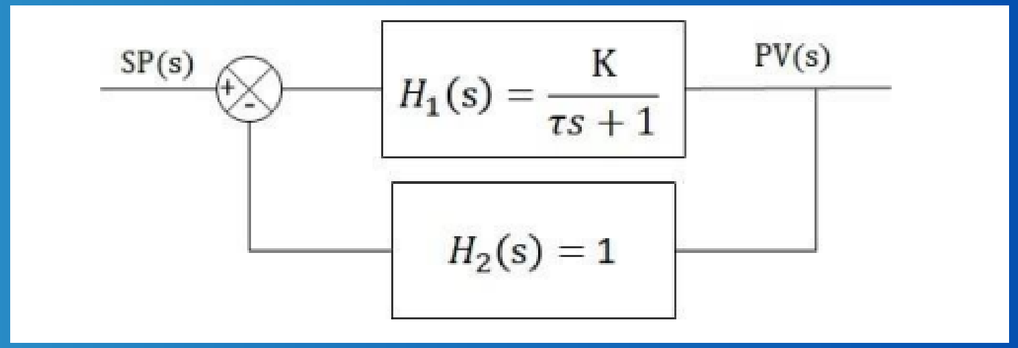
Plotando os gráficos:




```
>> 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:

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

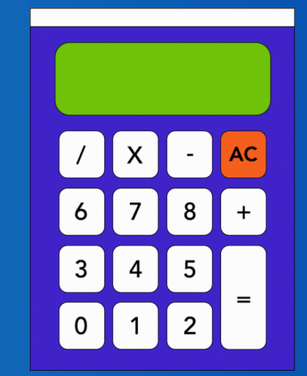
$Kp = (0.6*2.125)/(1*0.5)$

$Kp = 2.55$

$Ti = \tau$

$\tau = 2.125$

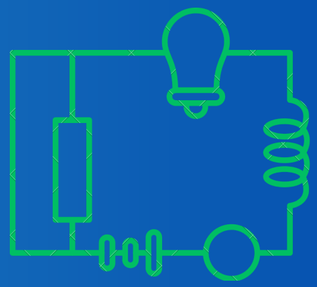
$Ti = 2.125$



$Td = 0.5*\Theta$

$Td = 0.5*0.5$

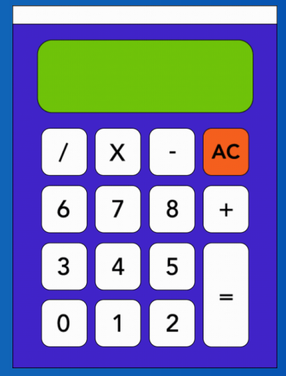
$Td = 0.25$



Calculando Controlador CHR PID

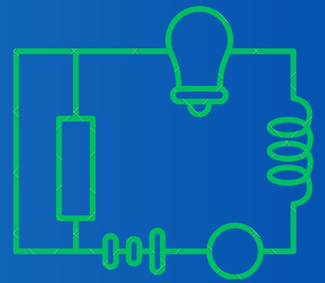
→ Método Cohen e Coon para Curva de Reação:

$Kp = (1/K)*(\tau/\Theta)*[(4/3)+(1/4)*(\Theta/\tau)]$
$Kp = (1/1)*(2.125/0.5)*[(4/3)+(1/4)*(0.5/2.125)]$
$Kp = 5.916$

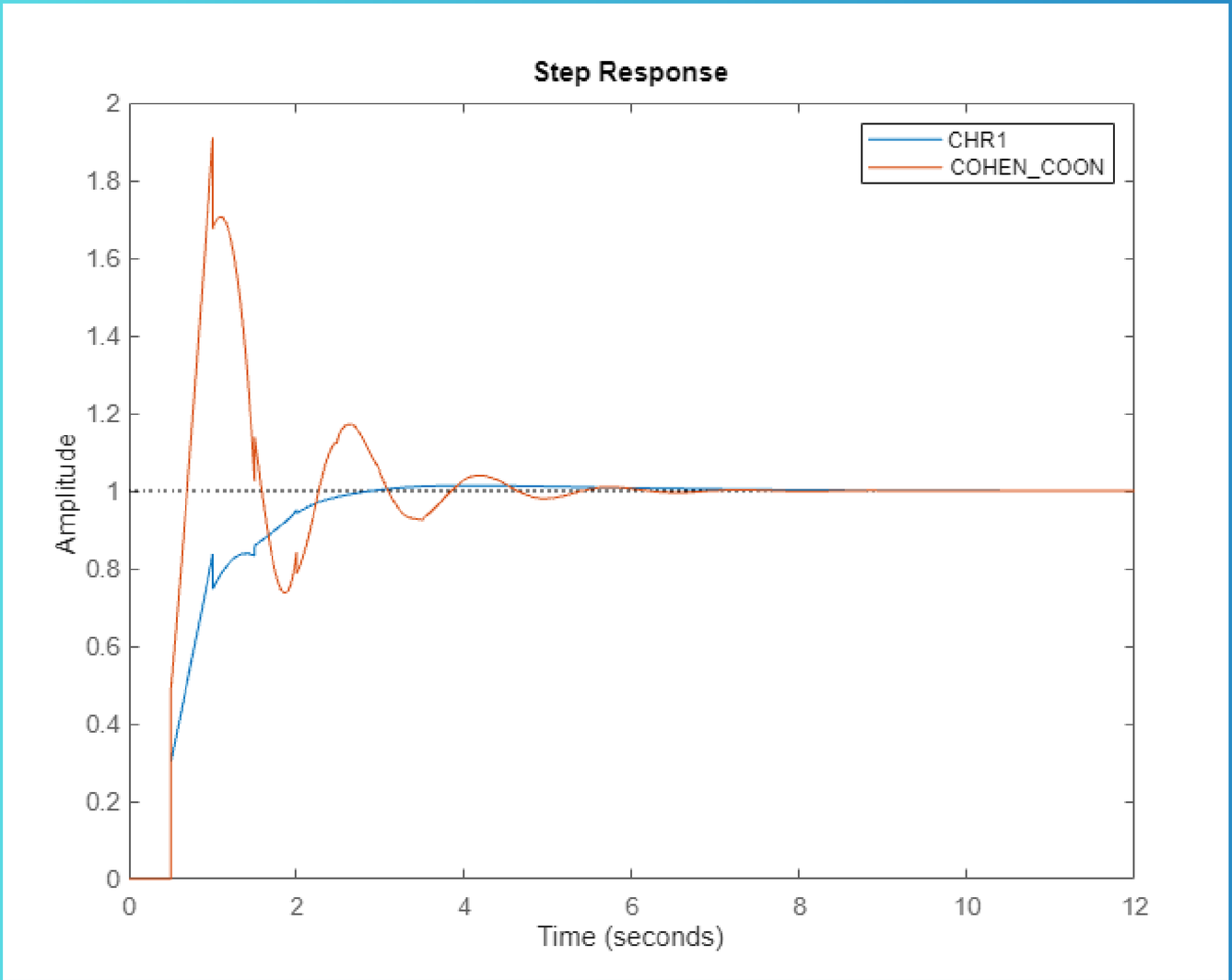


$Ti = \Theta*[(32+6*(\Theta/\tau))/(13+8*(\Theta/\tau))]$
$Ti = 0,5*[(32+6*(0.5/2.125))/(13+8*(0.5/2.125))]$
$Ti = 1.122$

$Td = \Theta*[(4)/(11+2*(\Theta/\tau))]$
$Td = 0.5*[(4)/(11+2*(0.5/2.125))]$
$Td = 0.174$



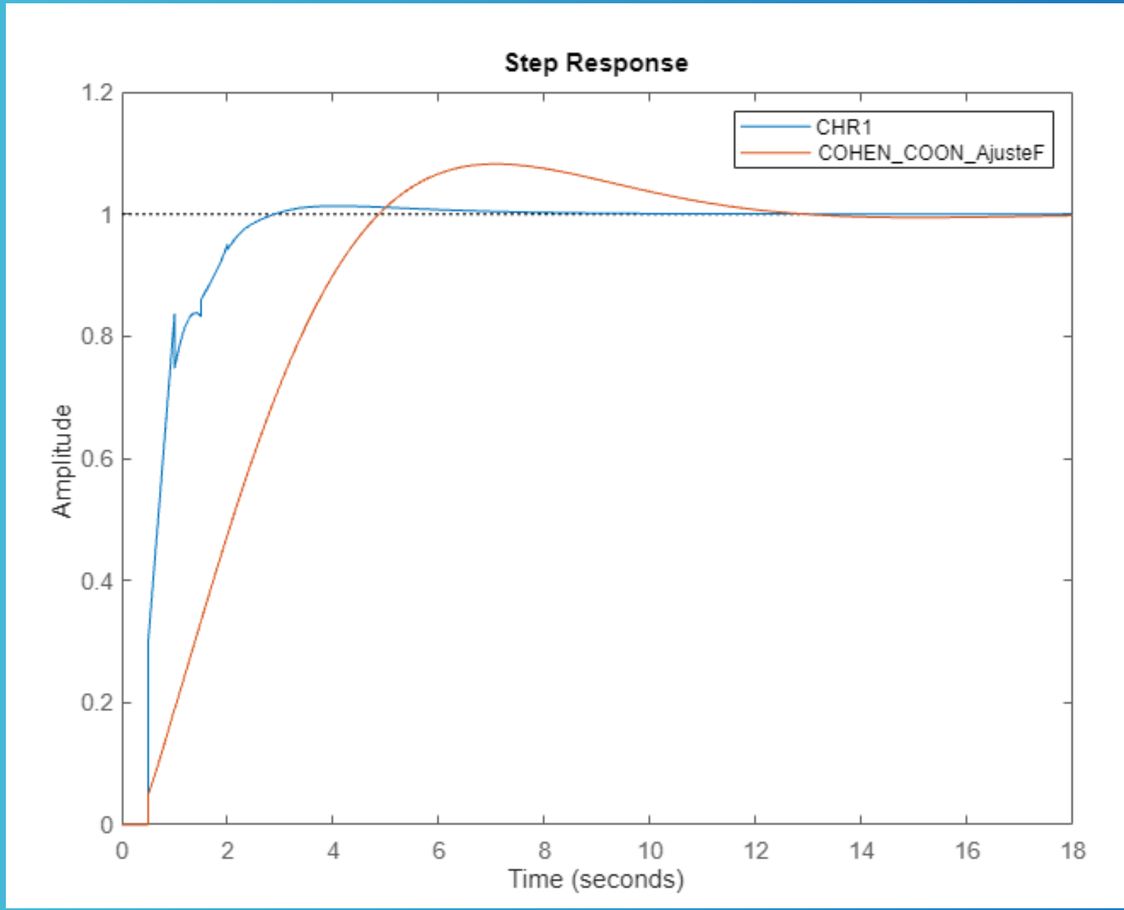
Plotando o gráfico do controlador




```
>> 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%) diminuímos o Kc do Cohen_Coon em 10 vezes (Kc = 0.5916).



Considerações dos métodos