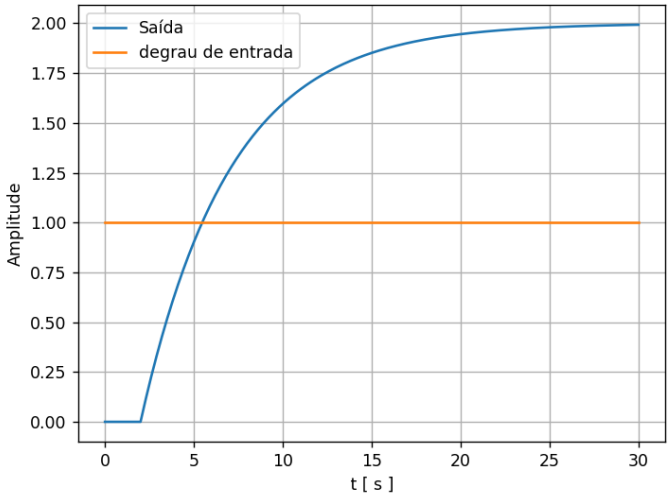
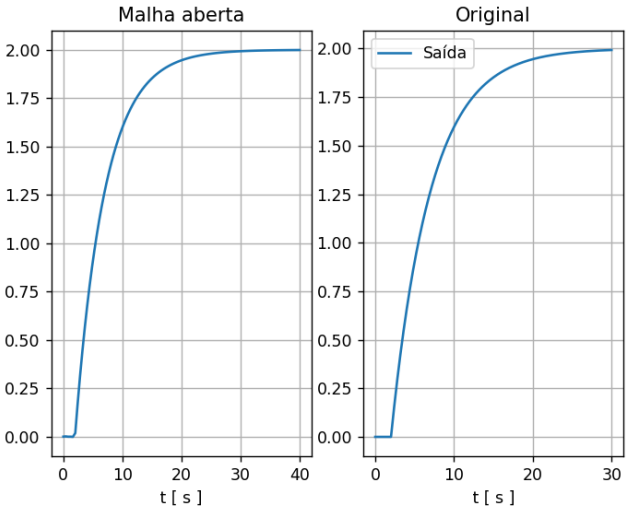
C213

1. Código Q01_02.



2. $K = 2$
   $\tau = 1,5 * (t1 - t2) = 1,5 * (6,67 - 3,64) = 4,995$
   $\theta = t2 - \tau = 6,67 - 4,995 = 1,975$
   $H(s) = \frac{2e^{-1,975s}}{4,995s+1}$

3. $Kp = \frac{2*\tau+\theta}{K*(2*\lambda+\theta)} = \frac{2*4,995+1,975}{2(2*1,778+1,975)} = \frac{11,965}{11,062} = 1,082$
   $Td = \frac{\tau*\theta}{2*\tau+\theta} = \frac{1,975*4,995}{2*4,995+1,975} = \frac{9,865}{11,965} = 0,824$
   $Ti = \tau * (\frac{\theta}{2}) = 4,995 * (\frac{1,975}{2}) = 4,932$



Código sendo plotado no arquivo Q03.py.

4. Erro em malha aberta

$e = setpoint - y$

$e = |1 - 2|$

$e = 1$

Erro em malha fechada

$e = setpoint - y$

$e = |1 - 1|$

$e = 0$

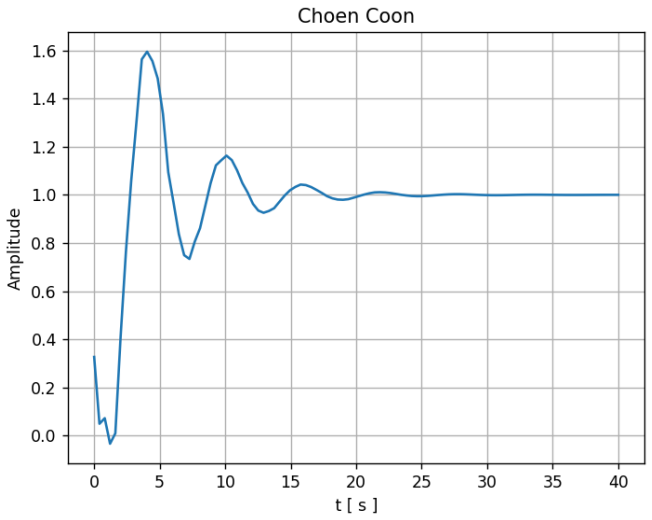
5. COHEN E COON

$$Kp = \frac{1 * \tau}{K * \theta}\left(\frac{4}{3} + \frac{\theta}{4\tau}\right) = \frac{4{,}995}{2 * 1{,}975}\left(\frac{4}{3} + \frac{1{,}975}{4 * 4{,}995}\right) = 1{,}256 * 1{,}432 = 1{,}81$$

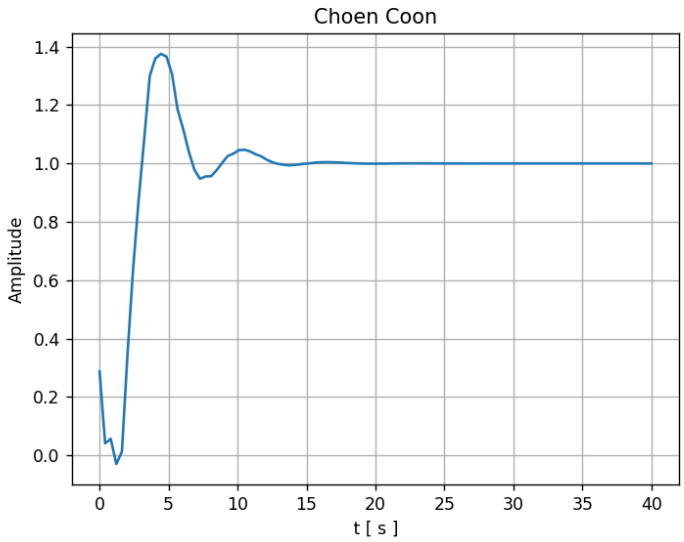
$$Ti = \theta\left(\frac{32 + 6\left(\frac{\theta}{\tau}\right)}{13 + 8\left(\frac{\theta}{\tau}\right)}\right) = 1{,}995 * \left(\frac{32 + 6\left(\frac{1{,}975}{4{,}995}\right)}{13 + 8\left(\frac{1{,}975}{5{,}995}\right)}\right) = 1{,}995 * 2{,}127 = 4{,}2$$

$$Td = \theta * \left(\frac{4}{11 + 2 * \left(\frac{\theta}{\tau}\right)}\right) = 1{,}975 * \left(\frac{4}{11 + 2 * \left(\frac{\theta}{\tau}\right)}\right) = 1{,}975 * 0{,}339 = 0{,}67$$

6. Ajuste do Kp.



Kp = 1,81



Kp = 1,5

7. A desvantagem percebida foi que o método Cohen-Coon tem um cálculo mais complexo.