Corrigé DS PCSI 1, octobre 21

Exo 1

1] $S(p) = \dfrac{2}{p(p+2)} = \dfrac{1}{p} - \dfrac{1}{p+2} \Rightarrow s(t) = (1 - e^{-2t})u(t)$

2] $S(p) = \dfrac{6}{p^2 + 6p + 13} = \dfrac{6 \times \frac{1}{2} \times 2}{(p+3)^2 + 4} \Rightarrow s(t) = 3 . e^{-3t} \sin(2t) . u(t)$

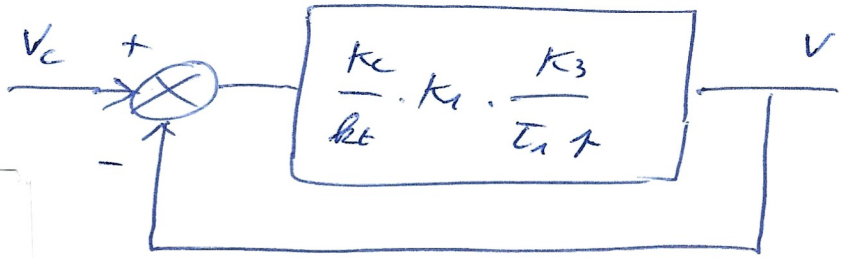
Exo 2 Stable ; $D = 0{,}25$; $\varepsilon(\infty) = 3$; $t_{5\%} = 11{,}38$ s

Exo 3

Q2] $H_1(p) = \dfrac{k_m}{RJp + k_m^2} = \dfrac{1/k_m}{1 + \frac{RJ}{k^2} p} = \dfrac{K_1}{1 + \tau_1 p}$

$H_2(p) = \dfrac{\frac{1}{Jp}}{1 + \frac{1}{Jp} \times \frac{k^2}{R}} = \dfrac{R}{RJp + k_m^2} = \dfrac{R/k_m^2}{1 + \frac{RJ}{k_m^2} p}$

Q3] $K_a = \dfrac{K_c}{k_t}$ Q4]



$H_c(p) = \dfrac{K_c K_1 K_3}{k_t \tau_1 p}$

Q5] $H_c(p) = \dfrac{5000 K_3}{p}$ ⚠ erreur dans le sujet

$FTBF(p) = \dfrac{5000 . K_3}{p + 5000 . K_3} = \dfrac{1}{1 + \frac{1}{5000 K_3} p} = \dfrac{K}{1 + \tau p}$

$K = 1 \Rightarrow$ Précis

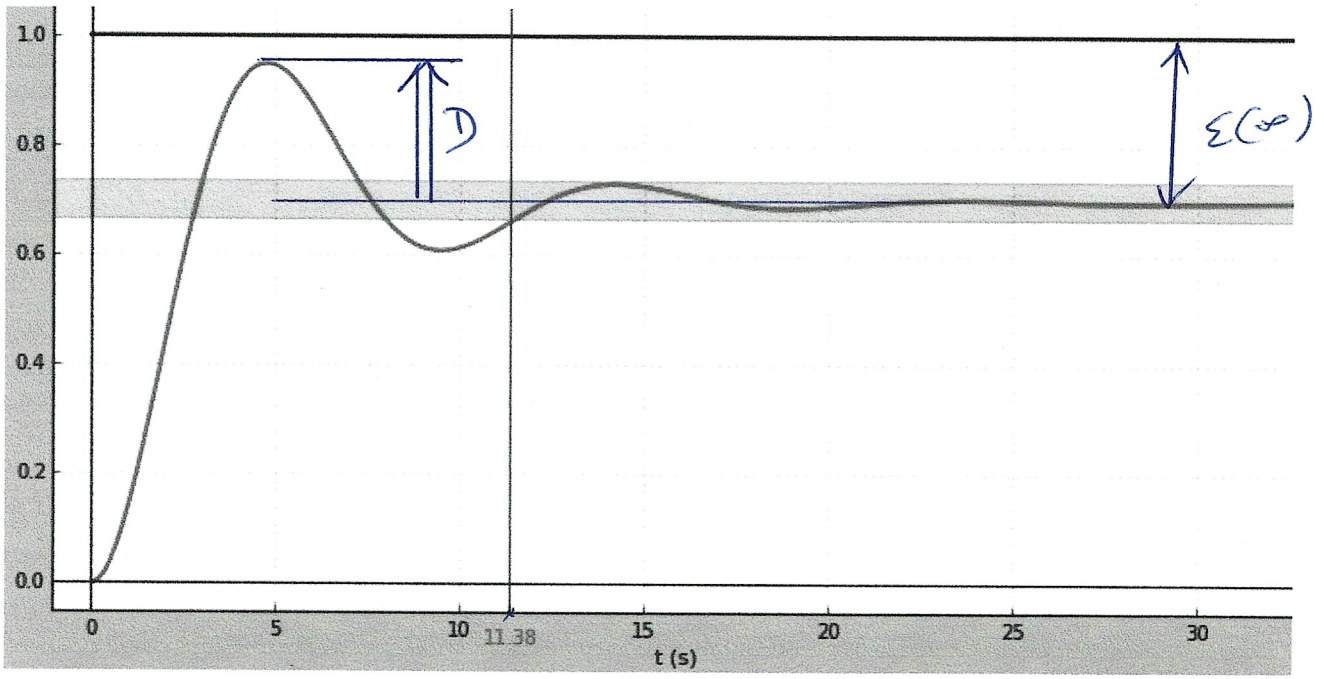
$t_{5\%} = 3\tau = \dfrac{3}{5000 K_3}$ | Performances

On veut $t_{5\%} = 0{,}3$ s $\Rightarrow K_3 = \dfrac{3}{5000 \times 0{,}3}$

$K_3 = 0{,}002$

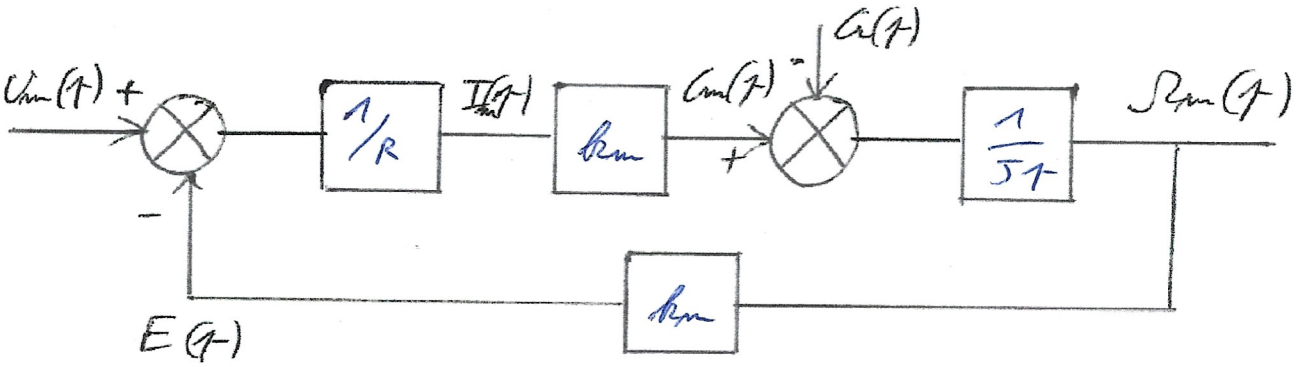
DS PCSI1, octobre 2021, document réponses

Exercice 2



$t_{5\%}$

Exercice 3 Question 2



Exercice 3 Question 3