

TD2 - Canaux de transmission

Exercice 1 - Adaptation à l'aide d'un stub

1) $Y_t = Y_L \times R_c = 1 + 1,8j$ (On a multiplié par 100 car $R_c = 100 \Omega$)
 $g_t = 0,8 - 0,48j \Rightarrow Z_t = 20 - 48j$

$\rho = 0,66$ (On trace le cercle et on part de la tangente à l'axe des abscisses, donc la perpendiculaire)

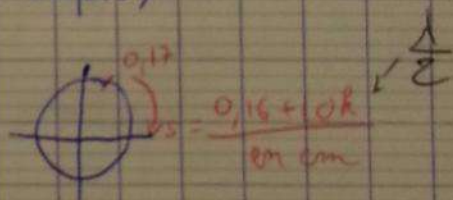
2) $\frac{\rho}{\lambda} = \frac{85}{20} = 4,25$

$g_e = g_t = 1 + 1,8j$ (car $4 = 8$ tours et $0,25$ mais comme en Y_t)
 $\Rightarrow Z_e = Y_t \Rightarrow 100 + 180j$

Ligne non-adaptée en entrée, car $Z_e \neq R_c$

3) $d = 0$, et directement sur la charge, car à cet endroit la partie réelle est $= R_c$ (partie réelle déjà adaptée).

$0,25 - 0,17 = 0,08 = \frac{s}{\lambda} = 0,08$



Je rapatrie g_t sur l'extrémité du cercle $\Rightarrow 0,17$

Dens-tan $- 0,17 \Rightarrow 0,08 = \frac{s}{\lambda}$

$s = \lambda \times 0,08 = 20 \times 0,08 = 1,6 \text{ cm}$

Exercice 2 - Lignes en régime transitoire

1)

$Z_t = 15 - 42,5j \Rightarrow g_t = \frac{15 - 42,5j}{50 (R_c)} = 0,3 - 0,85j$

$g_t = 0,4 + j$ $\rho = 0,65$

$$c = 0,65$$

$$2) \lambda = \frac{c}{f} = \frac{3 \cdot 10^8}{1,10^9} = 0,3 \text{ m.}$$

$$\frac{d}{\lambda} = 0,185 - 0,133 = 0,052 \Rightarrow d = 4,6 + 15 \text{ k cm}$$

$$\frac{d'}{\lambda} = 0,514 - 0,133 = 0,181 \Rightarrow d = 5,5 + 15 \text{ k cm.}$$

Exercice 8 ^{bio}

$$1) R_g = (1/3) R_c \text{ et } R_t = (1/3) R_c$$

$$\Gamma_e = \frac{R_g - R_c}{R_g + R_c} = \frac{1/3 R_c - R_c}{1/3 R_c + R_c} = \boxed{-\frac{1}{2}}$$

$$\Gamma_t = \frac{R_t - R_c}{R_t + R_c} = \boxed{-\frac{1}{2}}$$

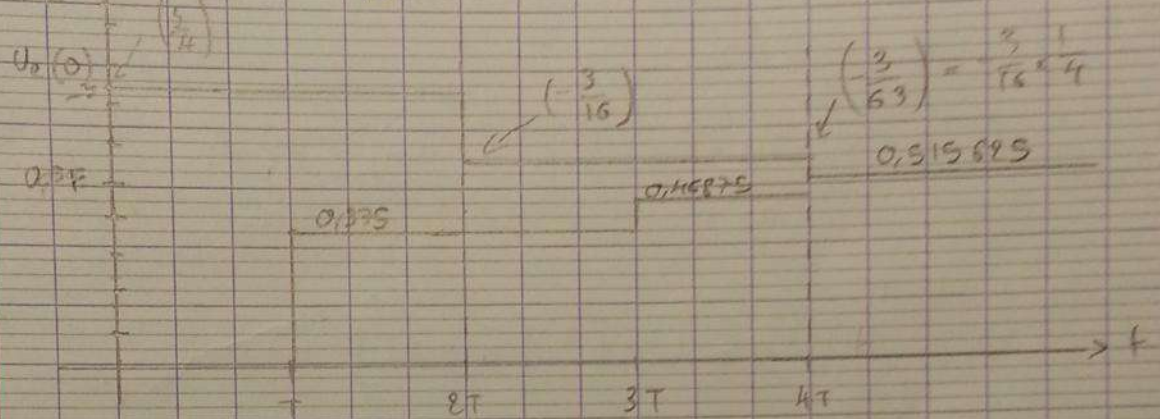
$$U_e(t) = \frac{R_c}{R_g + R_c} (1 + \Gamma_t) \left[e^{(t-T)} + \Gamma_e \Gamma_t e^{(t-3T)} \dots \right]$$

$$U_e(t) = \frac{R_c}{R_g + R_c} e(t) + \frac{R_c}{R_g + R_c} (1 + \Gamma_e) \Gamma_t \left[e^{(t-2T)} + \Gamma_e \Gamma_t e^{(t-4T)} \dots \right]$$

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$$U_H(t) = \frac{3}{8} \left[e(t-T) + \frac{1}{4} e(t-3T) + \dots \right]$$

$$U_e(t) = \frac{3}{4} e(t) - \frac{3}{16} \left[e(t-2T) + \frac{1}{4} e(t-4T) + \dots \right]$$

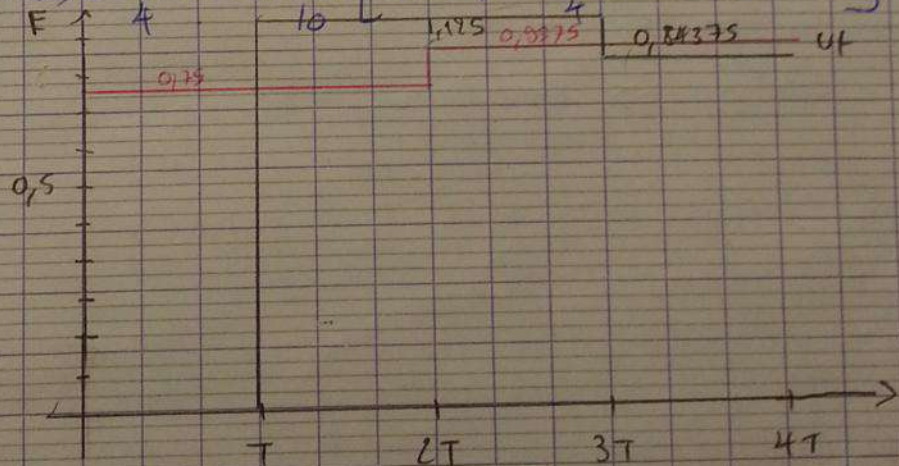


$$2) \Gamma_e = \frac{1}{2}$$

$$\Gamma_T = \frac{1}{2}$$

$$U_H(t) = \frac{3}{8} \left[e(t-T) - \frac{1}{4} e(t-3T) + \dots \right]$$

$$U_e(t) = \frac{3}{4} e(t) + \frac{3}{16} \left[e(t-2T) - \frac{1}{4} e(t-4T) + \dots \right]$$



Exercice 3

$$1) R_g = R_c$$

$$R_t = \infty$$

$$\Gamma_e = \frac{R_g - R_c}{R_g + R_c} = 0$$

$$\Gamma_t = \frac{R_t - R_c}{R_t + R_c} = 1$$

$$U_t(t) = \frac{1}{2} (1 + \Gamma_t) [e(t - \tau)] = e(t - \tau)$$

$$\begin{aligned} U_e(t) &= \frac{1}{2} e(t) + \frac{1}{2} (1 + \Gamma_e) \Gamma_t [e(t - 2\tau) + \dots] \\ &= \frac{1}{2} e(t) + \frac{1}{2} e(t - 2\tau) \end{aligned}$$

$$2) U_t(t) = \frac{1}{2} \times 0 = 0$$

$$U_e(t) = \frac{1}{2} e(t) - \frac{1}{2} [e(t - 2\tau) + \dots]$$

$$\cancel{R_c = \frac{1}{4} R_t} \quad \tau = \frac{1}{4} T$$

Echelon $\Rightarrow$ impulsion.