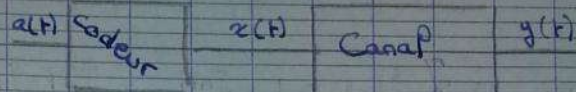


Common Num

Sujet 3 @



SLIT - Système Linéaire Invariant du Temps

$\sum \text{entrées} = \sum \text{sorties}$

$$y(t) = \sum a_k h(t - kT)$$

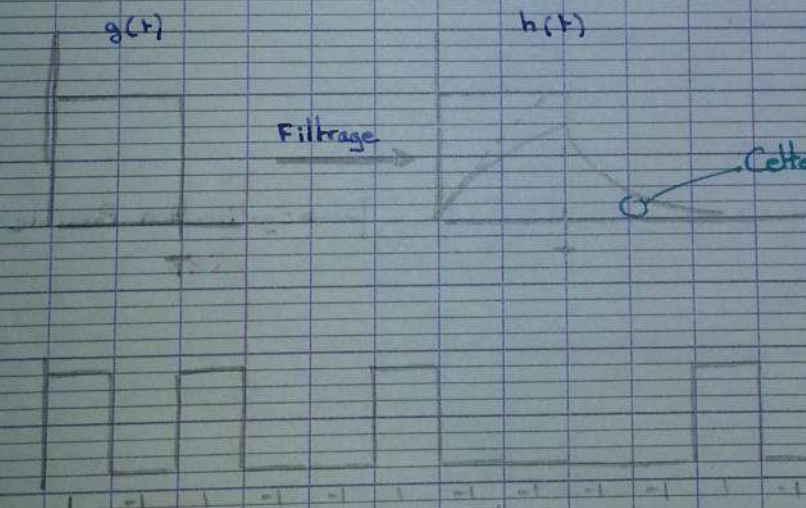
$$y(t_0 + nT) = \sum a_k h(t_0 + nT - kT)$$

$$= \sum a_k h(t_0 + (n - k)T) \quad \text{car } p = n - k \text{ et } k = n - p$$

$$= \sum a_{n-p} h(t_0 + pT)$$

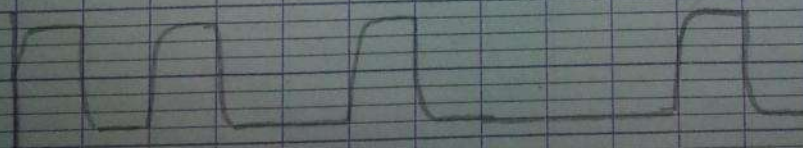
$$= a_n h(t_0) + \sum a_{n-p} h(t_0 + pT)$$

$$\Rightarrow h(t)?$$

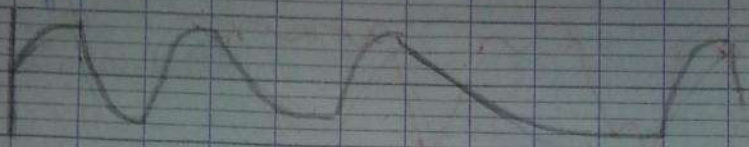


Cette variation implique un changement de signal du temps.
 $\Rightarrow$ Interférence entre symboles

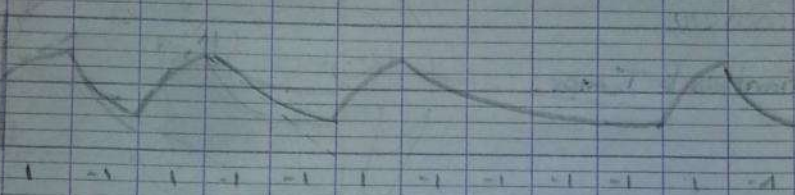
$$0 < T \ll T$$



$$\sigma \tau \approx T/3$$



$$\sigma \tau \approx T$$



$$\sigma \tau \gg T$$



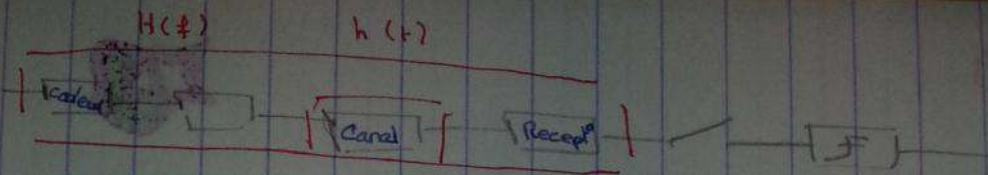
domaine fréquentiel.

$$\sigma \ll T \quad f_c = \frac{1}{2\pi\sigma} \rightarrow f_c \gg \frac{1}{T} \rightarrow \text{critère de Nyquist}$$

$$\sigma \approx T \quad f_c = \frac{1}{2\pi\sigma}, \quad f_c \approx \frac{1}{T} \quad \left[\sigma \approx \frac{T}{3}, f_c = \frac{1}{2\pi} \right] \rightarrow \text{Égalisation Possible}$$

$$\sigma \gg T \quad f_c \ll \frac{1}{T} \rightarrow \text{critère de Nyquist non respecté}$$

IES



Commun Num

Sujet 3 ②

Critère de Nyquist $\rightarrow$ f_c de transfert de l'ensemble du Cadeur à Recept°

$$\rightarrow \exists t_0 \text{ tq } h(t_0) \neq 0$$

$$h(t_0 + nT) = 0$$

$$h(t) = \int_{-\infty}^{+\infty} H(f) e^{2j\pi ft} df$$

$$h(t) = \int_{-f_c}^{f_c} H(f) e^{2j\pi ft} df = \int_{-f_c}^{f_c} A e^{2j\pi ft} df$$

$$= A \left[\frac{1}{2\pi t} e^{2j\pi ft} \right]_{-f_c}^{f_c}$$

$$= \frac{A}{2\pi t} [e^{2j\pi f_c t} - e^{-2j\pi f_c t}]$$

$$= \frac{A}{\pi t} (\sin(2\pi f_c t)) \times \frac{2f_c}{2f_c}$$

$$= A \operatorname{sinc}(2\pi f_c t)$$

$$\boxed{\begin{matrix} h(0) \neq 0 \\ h(nT) = 0 \end{matrix}}$$

filtre passe-bas Idéal.

$$\rightarrow \text{il faut que } f_c > \frac{1}{2T}$$

Modulations

4.1. Constellation

1. Porteuse $\rightarrow p(t) = A_0 \cos(\omega_0 t + \phi_0)$

- Modulation Amplitude

$$s(t) = A(t) \cos(\omega_0 t + \phi_0)$$

- Modulation Phase

$$s(t) = A_0 \cos(\omega_0 t + \phi(t))$$

Modulat° Numérique

↳ Etat Porteuse

= est sur T.

$\Rightarrow s(t) = A(t) \cos(\omega_0 t + \phi(t))$ Le couple (A, ϕ) porte l'information

$$= A(t) (\cos(\omega_0 t) \cos(\phi(t)) - \sin(\omega_0 t) \sin(\phi(t)))$$

$$= A(t) \cos(\phi(t)) \cos(\omega_0 t) - A(t) \sin(\phi(t)) \sin(\omega_0 t)$$

On pose $A(t) \cos(\phi(t)) = I(t)$, $A(t) \sin(\phi(t)) = Q(t)$ et $\omega_0 = 2\pi f_0 t$

$$= I(t) \cos(2\pi f_0 t) - Q(t) \sin(2\pi f_0 t)$$

Pour $T \in [kT; (k+1)T]$ $\rightarrow$ La porteuse est constante.

$$\text{↳ } s(t) = A_k \cos(\omega_0 t + \phi_k)$$

$$= I_k \cos \omega_0 t - Q_k \sin(\omega_0 t)$$

