Séance 5
QCM

Question 1

On considère $x(t) = \mathbb{1}_{[-\frac{1}{2}, \frac{1}{2}]}(t)$

A. $\displaystyle\int_{-\infty}^{+\infty} \delta(t)\, x(t)\, dt = 1$

B. $\displaystyle\int_{-\infty}^{+\infty} \delta'(t)\, x(t)\, dt = 1$

C. $\displaystyle\int_{-\infty}^{+\infty} \delta''(t)\, x(t)\, dt = 1$

D. $\displaystyle\int_{-\infty}^{+\infty} vp\left(\frac{1}{t}\right) x(t)\, dt = 1$

Question 2

A. $H(t)$ est pair

B. $\delta(t)$ est pair

C. $\delta'(t)$ est pair

D. $vp\left(\frac{1}{t}\right)$ est pair

Question 3

On considère $x(t) = \mathbb{1}_{[-\frac{1}{2}, \frac{1}{2}]}(t)$

et $X(\nu) = \dfrac{\sin \pi\nu}{\pi\nu}$ sa transformée de Fourier.

A. $TF\left[\mathbb{1}_{[0,1]}(t)\right] = \dfrac{\sin \pi\nu}{\pi\nu} e^{-i\pi\nu}$

B. $TF\left[\mathbb{1}_{[-2,2]}(t)\right] = \dfrac{\sin\left(\frac{\pi\nu}{4}\right)}{\pi\nu}$

C. $TF\left[\sin(2\pi t)\,\mathbb{1}_{[-\frac{1}{2}, \frac{1}{2}]}(t)\right] = \dfrac{1}{2i}\dfrac{\sin(\nu-1)\pi}{\pi(\nu-1)} - \dfrac{1}{2i}\dfrac{\sin(\nu+1)\pi}{\pi(\nu+1)}$

C. $TF[\sin(2\pi t)\, x(t)]$

$\quad = \dfrac{1}{2i}\dfrac{\sin \pi(\nu-1)}{\pi(\nu-1)} - \dfrac{1}{2i}\dfrac{\sin \pi(\nu+1)}{\pi(\nu+1)}$

D. $TF\left[\dfrac{1}{2}\delta(t+\tfrac{1}{2}) - \dfrac{1}{2}\delta(t-\tfrac{1}{2})\right]$

$\quad = 2i\,\sin(\pi\nu)$

Question 4

On considère $x(t) = \mathbb{1}_{[0,1]}(t)$, et $X(\nu) = TF[x(t)]$

A. $TF[t\,x(t)] = \dfrac{-1}{2i\pi}\dfrac{d}{d\nu}X(\nu)$

B. $TF\left[\displaystyle\int_{-\infty}^{t} x(\tau)\,d\tau\right] = \dfrac{1}{2i\pi\nu}X(\nu) + c^{te}\,\delta(\nu)$

C. $TF\left[\dfrac{d}{dt}x(t)\right] = \dfrac{1}{2} - \dfrac{1}{2}e^{-2i\pi\nu}$

D. $TF[x(t) - x(t-1)] = \left(1 - e^{-i\pi\nu}\right)X(\nu)$

Question 5

On considère $x(t) = \mathbb{1}_{[-1,0]}(t) - \mathbb{1}_{[0,1]}(t)$

A. $TF\left[\dfrac{d}{dt}x(t)\right] = \left(e^{i\pi\nu} - e^{-i\pi\nu}\right)^2$

B. $X(0) = 1$

C. $\displaystyle\int_{-\infty}^{+\infty} TF[x(t) - x(-t)](\nu)\,d\nu = 2$

D. $\displaystyle\int_{-\infty}^{t} x(\tau)\,d\tau = (1 - |t|)\,\mathbb{1}_{[-1,1]}(t)$