Homework N° 01

Name:…….

Course questions

1. Provide an example of signals with: Finite and infinite energy.

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2. How to determine convolution?

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3. The convolution product of the unit step function by itself is a ramp function: True False

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Exercice 01 :

Determine the parameters $\{A_n, \varphi_n\}$ of the cosine representation of the Fourier series of the following signal:

$x(t) = 4 + 1.8cos\left(2\pi f_0 t + \frac{\pi}{3}\right) + 0.8sin(6\pi f_0 t)$; $f_0 = 1kHz$

We give : $sin(x) = cos\left(x - \frac{\pi}{2}\right)$

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Exercice 02 :

Let the signal be $f(t)=e^{-at}\,U(t)$ and,

$$U(t) = \begin{cases} 1 & t \geq 0 \\ 0 & t < 0 \end{cases}$$

a) Calculate the Fourier transform of x(t). Plot its spectrum.

b) y(t) = x(t) + x(t). Draw y(t), calculate the Fourier Transform of y(t), plot the corresponding spectrum.

c) z(t) = x(t)x(-t). Draw z(t), calculate the Fourier Transform of z(t), plot the corresponding spectrum.

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