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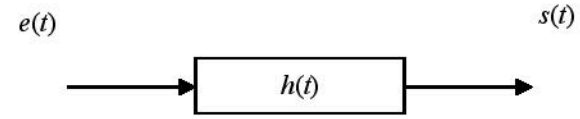
Department of Electrical Engineering

2nd year LMD (Auto+ELT)
Module: Signal Theory

Tutorials No 04

Exercise 1

Consider the system in the following figure:

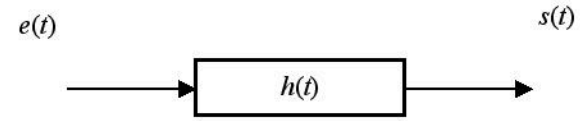


With : $e(t) = 2 f_0 \sin c(2\pi f_0 t) e^{-j2\pi f_0 t}$ and $h(t) = f_0 \sin c^2(\pi f_0 t)$

1. Calculate the energy of the output signal $s(t) = e(t) * h(t)$

Exercise 2

Consider the system in the following figure:

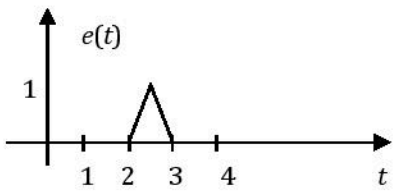


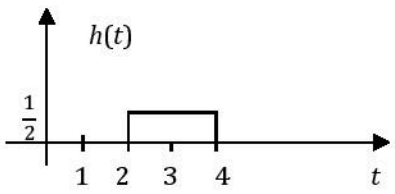
With : $e(t) = h(t) = p_T(t)$

1. Find the convolution of two identical rectangular signals of duration T and unit amplitude.
2. Calculate the Fourier transform $F\{s(t)\}$ using the convolution theorem; then calculate $s(t)$.

Exercise 3

We have the input function $e(t)$ and the system function $h(t)$ data by:





1. Over what time interval $s(t)$ will it be different from zero?
2. At what times $s(t)$ will reach its maximum?
3. Assess $s(t) = e(t) * h(t)$.