Lab #6

Objectives

- Signal and System in Frequency Domain
- Use Scilab to draw spectrums

Report

1. Your report must include your answers in hand-written or computer-aid tools (word, latex).
2. Do not share your report with your friends.
3. Finally, you upload your report to BKeL on time.

EXERCISES

Exercise 1. Find Fourier transform of the following signals

a. $x_1(t) = \begin{cases} 1 - \frac{|t|}{\tau} & |t| \le \tau \\ 0 & |t| > \tau \end{cases}$

b. $x_2(t) = e^{j\omega_0 t}$

Exercise 2. Find Fourier transform of the following signals

a. $x_1(n) = u(n) - u(n-6)$

b. $x_2(n) = 2^n u(-n)$

c. $x_3(n) = \left(\frac{1}{4}\right)^n u(n+4)$

d. $x_4(n) = \begin{cases} 2 - \frac{1}{2}n & |n| \le 4 \\ 0 & |n| > 4 \end{cases}$

e. $x_5(n) = |a|^n sin(\omega_0 n) |a| < 1$

Exercise 3. Use Scilab to draw the amplitude spectrum and phase spectrum of the following signals

a. $x_1(n) = 0.1^n u(n)$

b. $x_2(n) = \delta(n) + \delta(n-1) + \delta(n-2) + \delta(n-3)$

Exercise 4. Given LTI system by the following input-ouput description equation

$$y(n) + 0.1y(n-1) + 0.2y(n-2) = x(n)$$

Determine the Fourier transform of the impulse response h(n) and then draw the amplitude spectrum and phase spectrum.

Exercise 5. Given LTI system $h(n) = \delta(n) + \delta(n-1)$. Determine output y(n) when input x$(n) = 0.5^n u(n)$ by using Fourier Transform. Then, use SciLab to draw amplitude and phase spectrums.

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