

EE 200: Quiz 2
Duration 40 Minutes

Use the following format of answering:

Name:

Roll No:

Section:

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*Write **only** the final answer in each question. All questions carry equal marks. Answer scripts submitted after 40 minutes will be penalized with negative marks. The submission channel will be closed at completion of 40 minutes.*

1. A continuous time LTI system has an impulse response given by $h(t) = e^{-t}u(t)$. If an input $x(t) = e^{-2t}u(t)$ is applied to this system, find the output $y(t)$.
2. (a) The fundamental periods of four periodic analog signals are $T_a = \frac{3}{7}s$, $T_b = \frac{5}{6}s$, $T_c = \frac{2}{5}s$, and $T_d = \frac{7}{9}s$, respectively. Determine the fundamental period T_0 of the weighted sum of the these four periodic signals.
(b) Determine the exponential Fourier series representations of the periodic analog signal

$$\tilde{x}(t) = 3 \cos \left(\Omega_0 t + \frac{\pi}{3} \right) + 5 \cos \left(3\Omega_0 t + \frac{\pi}{5} \right)$$

3. Let $X_i(j\Omega)$, $1 \leq i \leq 4$, denote the CTFT of the analog signals shown in the following figure:

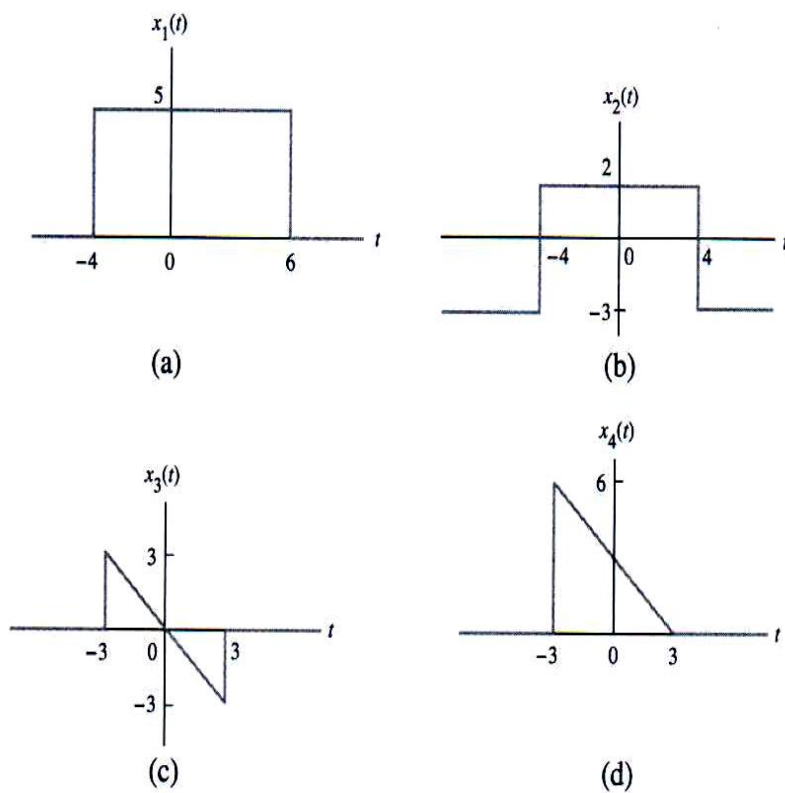


Figure 1: Diagram for Question 3

Determine the CTFT values $X_i(j0)$ without computing the CTFT.

4. Using the known Fourier transform pair:

$$e^{-\alpha t} \mu(t) \leftrightarrow \frac{1}{\alpha + j\Omega}, \quad \alpha > 0$$

find

$$x(t) \leftrightarrow X(j\Omega) = \frac{1}{(\alpha + j\Omega)(\alpha + j\Omega)}$$