

ECE351: Signals and Systems I - Fall 2023 - Dr. Thinh Nguyen
Homework 6
Due 11/08/2023

1. Evaluate the frequency-domain representations of the following signals:

(a)

$$x(t) = e^{-2t}u(t-3)$$

(b)

$$x(t) = e^{-4|t|}$$

(c)

$$x(t) = te^{-t}u(t)$$

2. Determine the time-domain signals corresponding to the following FTs:

(a)

$$X(j\omega) = \begin{cases} \cos(2\omega), & |\omega| \leq \frac{\pi}{4} \\ 0, & \text{otherwise} \end{cases}$$

(b)

$$X(j\omega) = e^{-2\omega}u(\omega)$$

(c)

$$X(j\omega) = e^{-2|\omega|}$$

3. Determine the appropriate Fourier representations of the following time-domain signals.

(a)

$$x(t) = e^{-t} \cos(2\pi t)u(t)$$

(b)

$$X[n] = \begin{cases} \cos(\frac{\pi}{10}n) + j \sin(\frac{\pi}{10}n), & |n| < 10 \\ 0, & \text{otherwise} \end{cases}$$

(c)

$$x(t) = e^{1+t}u(-t+2)$$