Department of Electrical Engineering
School of Science and Engineering

EE310 Signals and Systems

TUTORIAL 8

Tutorial 8-1

For $x(t)$ shown in Fig. 1, determine the following:

(a) $\measuredangle X(j\omega)$

(b) $X(j0)$

(c) $\displaystyle\int_{-\infty}^{\infty} X(j\omega)\, d\omega$

(d) $\displaystyle\int_{-\infty}^{\infty} X(j\omega)\, e^{j2\omega} \frac{2\sin(\omega)}{\omega}\, d\omega$

(e) Inverse Fourier transform of $\mathrm{Re}\{X(j\omega)\}$.

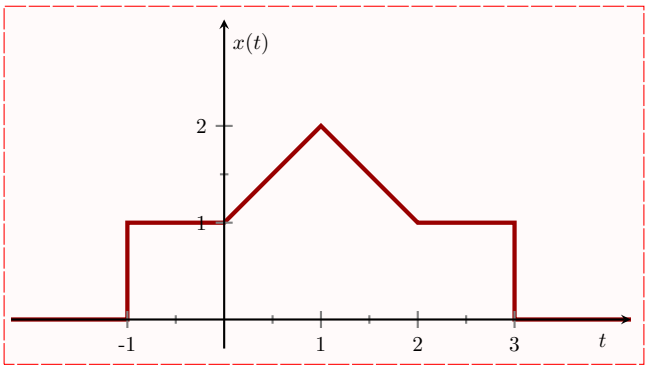

Figure 1: $x(t)$ for Problem 8-1.

Tutorial 8-2

(Problem 4.37) Consider the continuous-time signal $x(t)$ shown in Fig. 2.

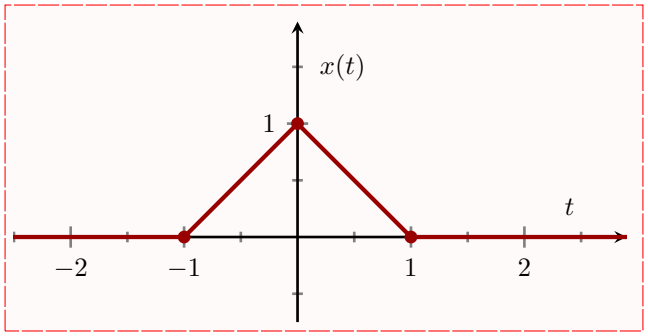

Figure 2: $x(t)$ for Problem 8-2.

(a) Sketch the signal

$$y(t) = x(t) * \sum_{k=-\infty}^{\infty} \delta(t - k4)$$

(b) Find another signal $g(t)$ such that $g(t)$ is not as the same as $x(t)$ and

$$y(t) = g(t) * \sum_{k=-\infty}^{\infty} \delta(t - k4).$$

(c) Determine the values of ω for which $G(j\omega) = X(j\omega)$, where $G(j\omega)$ and $X(j\omega)$ are the Fourier transform of the signal $x(t)$ and $g(t)$ respectively.

Tutorial 8-3

(Example 4.19) For an LTI system with impulse response

$$h(t) = e^{-\alpha t}\, u(t), \alpha > 0,$$

determine the output for the following input signal

$$h(t) = e^{-\beta t}\, u(t), \beta > 0.$$