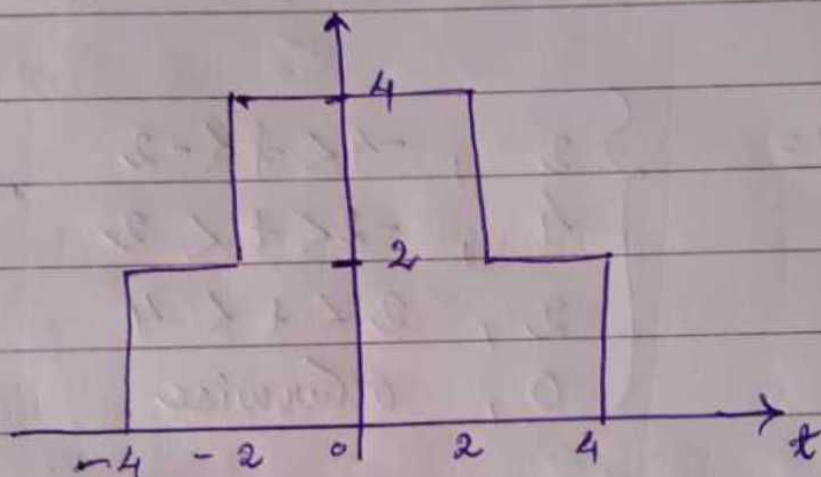


Fourier Transform

Numericals

Q.1. Find the F.T. of the s/g:

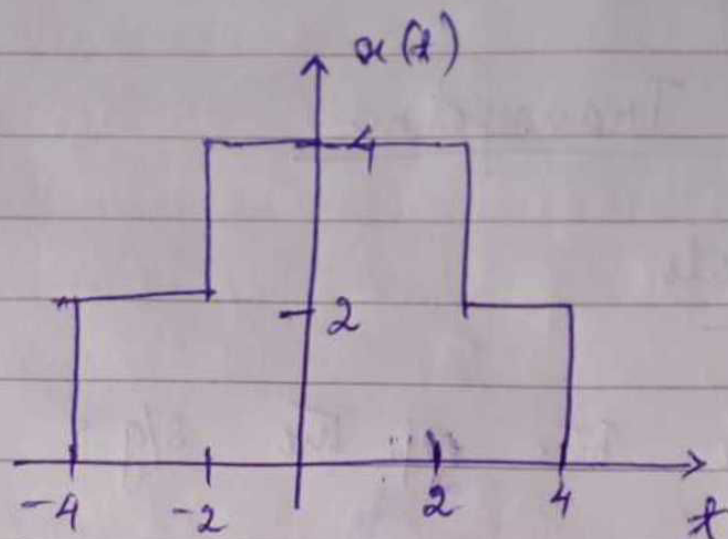


Q.2. Find inverse F.T. of $e^{-2\omega} u(\omega)$:

Q.3. Find the Fourier Transform of:

$$x(t) = \begin{cases} (1-t^2), & 0 < t < 1 \\ 0 & \text{otherwise} \end{cases}$$

Q1. Soln



$$x(t) = \begin{cases} 2, & -4 < t < -2 \\ 4, & -2 < t < 2 \\ 2, & 2 < t < 4 \\ 0, & \text{otherwise} \end{cases}$$

$$X(\omega) = \int_{-\infty}^{\infty} x(t) e^{-j\omega t} dt$$

$$= \int_{-4}^{-2} 2e^{-j\omega t} dt + \int_{-2}^2 4e^{-j\omega t} dt$$

$$+ \int_2^4 2e^{-j\omega t} dt$$

$$= 2 \left[\frac{e^{-j\omega t}}{-j\omega} \right]_{-4}^{-2}$$

Q2 Soln:

$$x(t) = \frac{1}{2\pi} \int_{-\infty}^{\infty} e^{-2\omega} u(\omega) e^{j\omega t} d\omega.$$

$$= \frac{1}{2\pi} \int_0^{\infty} e^{-2\omega} e^{j\omega t} d\omega$$

$$= \frac{1}{2\pi} \int_0^{\infty} e^{-(2-jt)\omega} d\omega$$

$$= \frac{1}{2\pi} \left[\frac{e^{-(2-jt)\omega}}{-(2-jt)} \right]_0^{\infty}$$

$$= \frac{1}{2\pi(2-jt)}$$