EE3210 Signals and Systems

Tutorial 10

Problem 1: Compute the Fourier transform of each of the following signals:

(a) $x(t) = \sum_{k=0}^{+\infty} \alpha^k \delta(t - kT)$, $|\alpha| < 1$

(b) $x[n] = 4^n u[-n]$

Problem 2: Given that $x(t)$ has the Fourier transform $X(\omega)$, express the Fourier transform of each of the following signals in terms of $X(\omega)$:

(a) $x(1 - t) + x(-1 - t)$

(b) $x(3t - 6)$

(c) $\dfrac{d^2 x(t-1)}{dt^2}$

Problem 3: Determine the continuous-time signal corresponding to each of the following Fourier transforms:

(a) $X(\omega) = 2\pi\delta(\omega - \omega_0)$, where ω_0 is a real number.

(b) $X(\omega) = 2[\delta(\omega - 1) - \delta(\omega + 1)] + 3[\delta(\omega - 2\pi) + \delta(\omega + 2\pi)]$