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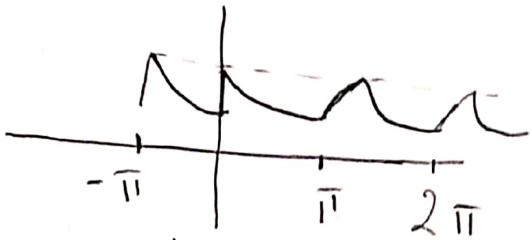
ID: 6071 Part-(1)
Group: 2 Section: 2 Question(3)

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



$$F_n = \frac{1}{\pi}\int_0^{\pi} e^{-t}\, e^{-jn\omega t}\, dt \quad , \omega = \frac{2\pi}{T} = \frac{2\pi}{\pi} = 2$$

$$= \frac{1}{\pi}\int_0^{\pi} e^{-t}\, e^{-j2nt}\, dt = \frac{1}{\pi}\int_0^{\pi} e^{-t-j2nt}$$

$$F_n = \frac{1}{\pi}\int_0^{\pi} e^{-t(1+j2n)}\, dt$$

$$F_0 = \frac{1}{\pi}\int_0^{\pi} e^{-t(1+0)}\, dt = \frac{1}{\pi}\int_0^{\pi} e^{-t} = \frac{1}{\pi}\left[-e^{-t}\right]_0^{\pi}$$

$F_0 = 0.305$

$$F_0 = \frac{1}{\pi}\left(+e^{-\pi} + 1\right) = 0.305$$

$$F_n = \frac{-1}{\pi(1+j2n)}\left[e^{-t(1+j2n)}\right]_0^{\pi}$$

$$F_n = \frac{-1}{\pi(1+j2n)}\left[e^{-\pi(1+j2n)} - 1\right]$$

$$F_n = \frac{1}{\pi(1+j2n)}\left(1 - e^{-\pi(1+j2n)}\right)$$