EE 4414 HW #1 (Chapt 2) page

due Thursday.

Problem 2.1 ⟹ 2.19 in new Book.

(a) Find the Fourier transform of the half-cosine pulse shown in Fig. P2.4(*a*).
(b) Apply the time-shifting property to the result obtained in part (a) to evaluate the spectrum of the half-sine pulse shown in Fig. P2.4(*b*).
(c) What is the spectrum of a half-sine pulse having a duration equal to aT?
(d) What is the spectrum of the negative half-sine pulse shown in Fig. P2.4(*c*)?
(e) Find the spectrum of the single sine pulse shown in Fig. P2.4(*d*).

Hint: $g(t) = A\cos\left(\frac{\pi t}{T}\right) \cdot \text{rect}\left(\frac{t}{T}\right)$

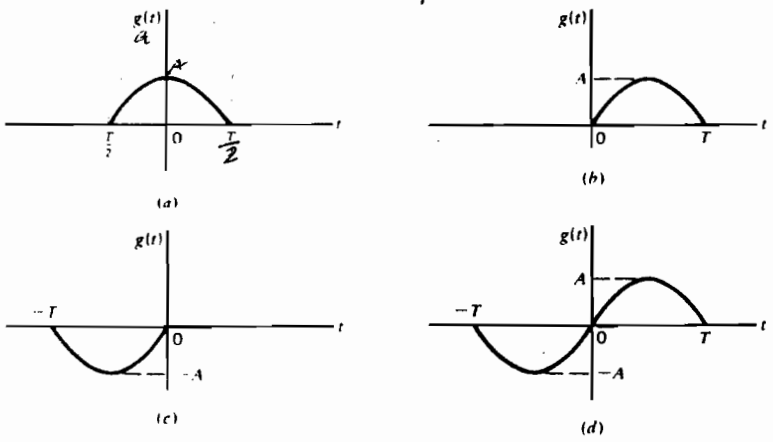

Figure P2.4

Prob. # 2.2

Given $g(t) = \exp(-t)\sin(2\pi f_c t)\,u(t)$. Find the Fourier Transform of $g(t)$: $F.T[g(t)] = ?$

2.3 ⟹ 2.20 in new Book.

Problem: Any function $g(t)$ can be split unambiguously into an *even part* and an *odd part*, as shown by

$$g(t) = g_e(t) + g_o(t) \quad \Rightarrow \quad g(t) = g_e(t) + g_o(t)$$

The even part is defined by

$$g_e(t) = \tfrac{1}{2}[g(t) + g(-t)]$$

and the odd part is defined by

$$g_o(t) = \tfrac{1}{2}[g(t) - g(-t)]$$

(a) Evaluate the even and odd parts of a rectangular pulse defined by

$$g(t) = A\,\text{rect}\left(\frac{t}{T} - \frac{1}{2}\right)$$

(That is find F.T. of $g_e(t)$ or $g_o(t)$)

(b) What are the Fourier transforms of these two parts of the pulse?

2.4

Problem Determine the inverse Fourier transform of the frequency function $G(f)$ defined by the amplitude and phase spectra shown in Fig. P .

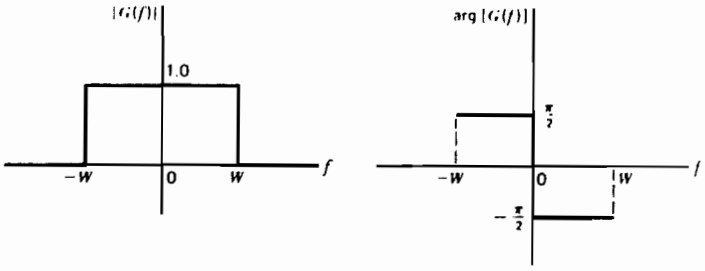

Figure P2.5