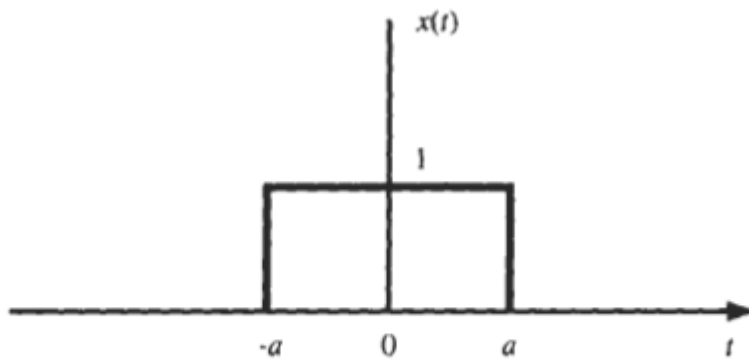




SHEET NO (4)

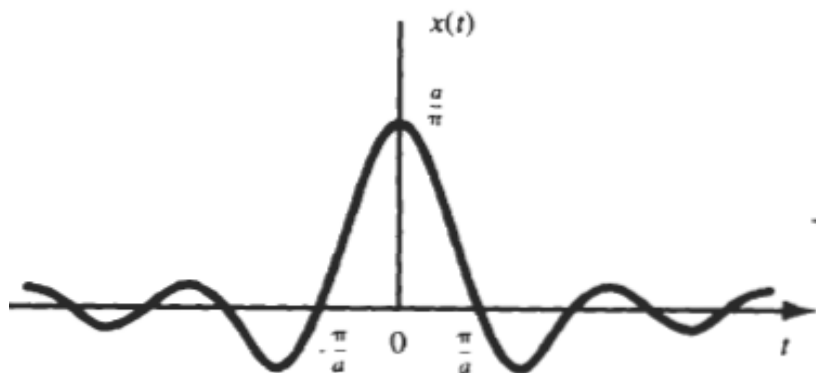
5.19. Find the Fourier transform of the rectangular pulse signal  $x(t)$  [Fig. 5-16(a)] defined by

$$x(t) = p_a(t) = \begin{cases} 1 & |t| < a \\ 0 & |t| > a \end{cases} \quad (5.135)$$



(a)

5.20. Find the Fourier transform of the signal [Fig. 5-17(a)]



(a)

**Q5(20 pt)**

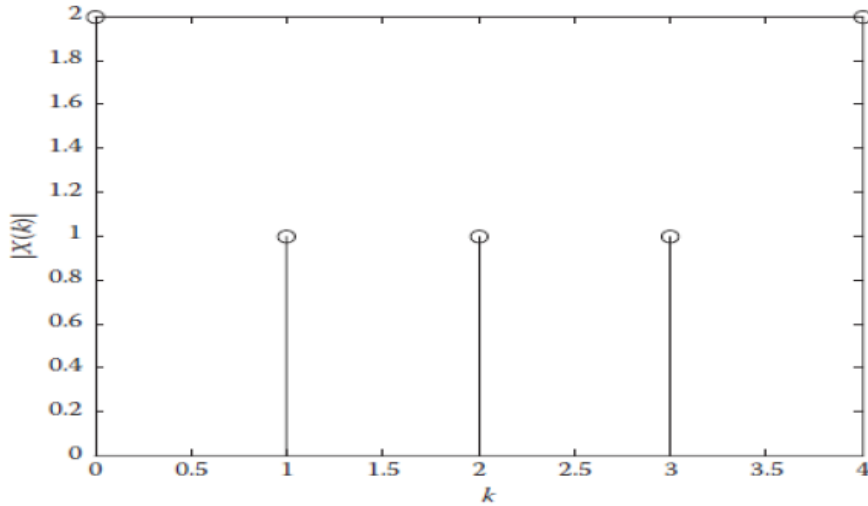
(a) Find the N-point DFT of the following sequences  $x(n)$

i)  $x(n) = \delta(n)$                       (ii)  $x(n) = u(n) - u(n-N)$

(b) Consider the magnitude DFT of the signal  $x(n)$  that was obtained by sampling a continuous sinusoid at  $f_s = 1000$  Hz as shown in the figure below.

(i) What is the frequency in Hz at which  $|X(k)|$  is maximum?

(ii) What is the frequency in Hz at which  $|X(k)|$  is minimum?



**8.5.** Compute the DFT of each of the following finite-length sequences considered to be of length  $N$  (where  $N$  is even):

(a)  $x[n] = \delta[n]$ ,

(b)  $x[n] = \delta[n - n_0]$ ,  $0 \leq n_0 \leq N - 1$ ,

I. (5 pt.) Sketch the sequence

$$y[n] = \alpha^{|n|}$$

for  $|\alpha| < 1$  and find its DTFT. Why do we require  $|\alpha| < 1$ ?