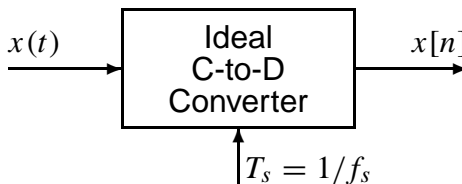


**PROBLEM:**



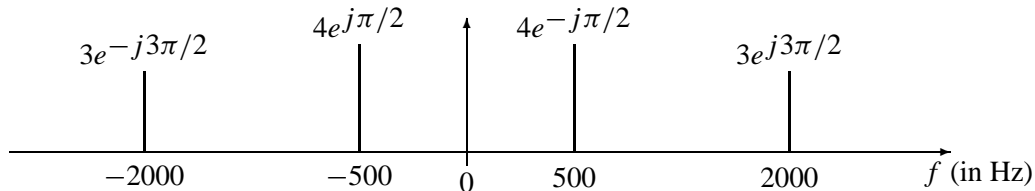
(a) Suppose that the discrete-time signal  $x[n]$  is given by the formula

$$x[n] = 10 \cos(0.20\pi n - \pi/3)$$

If the sampling rate is  $f_s = 2500$  samples/second, many *different* continuous-time signals  $x(t) = x_i(t)$  could have been inputs to the above system. Determine two such inputs with frequency less than 2500 Hz; i.e., find  $x_1(t)$  and  $x_2(t)$  such that  $x[n] = x_1(nT_s) = x_2(nT_s)$  if  $T_s = 1/2500$ . Give *only* the frequency and phase for each signal.

$x_1(t)$ :	$f_1 =$	Hz	$\phi_1 =$	rads
$x_2(t)$ :	$f_2 =$	Hz	$\phi_2 =$	rads

(b) If the input  $x(t)$  is given by the two-sided spectrum representation shown below,



Determine the spectrum for  $x[n]$  when  $f_s = 2500$  samples/sec. Make a plot for your answer, but label the frequency, amplitude and phase of each spectral component.

