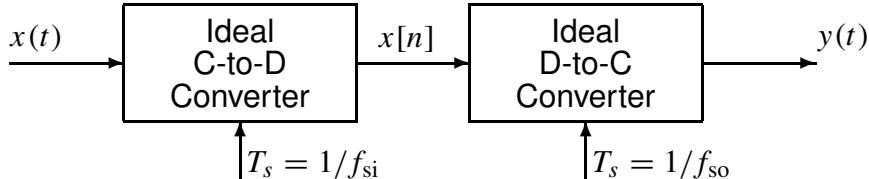


**PROBLEM:**

- (a) Suppose that the input  $x(t)$  is given by

$$x(t) = 10 + 10 \cos(2\pi(2000)t - \pi) + 8 \cos(2\pi(7000)t - 3\pi/4)$$

Determine the spectrum for  $x[n]$  when  $f_{si} = 10000$  samples/sec. Make a plot for your answer, making sure to label the frequency, amplitude and phase of each spectral component.

- (b) Using the discrete-time spectrum from part (a), determine the analog frequency components in the output  $y(t)$  when the sampling rate of the D-to-C converter is  $f_{so} = 10000$  Hz.
- (c) Again using the discrete-time spectrum from part (b), determine the analog frequency components in the output  $y(t)$  when the sampling rate of the D-to-C converter is  $f_{so} = 20000$  Hz. In other words, the sampling rates of the two converters are different.