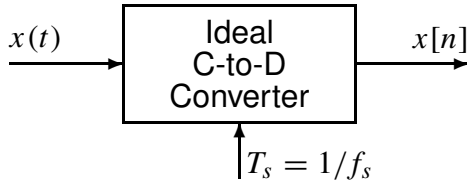


PROBLEM:

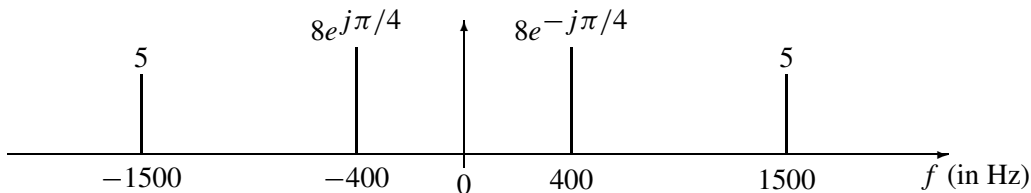
(a) Suppose that the continuous-time signal $x(t)$ is defined by

$$x(t) = \begin{cases} \cos(2000\pi t) & 0 \leq t \leq 0.5 \\ 0 & \text{elsewhere} \end{cases}$$

If the sampling frequency is $f_s = 8000$ samples/sec, determine a formula for the discrete-time signal $x[n]$. State explicitly the length, L , of the non-zero portion of $x[n]$.

$$L = \boxed{}$$

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



Determine the spectrum for $x[n]$ when $f_s = 500$ samples/sec. Make a plot for your answer, but label the frequency, amplitude and phase of each spectral component.

