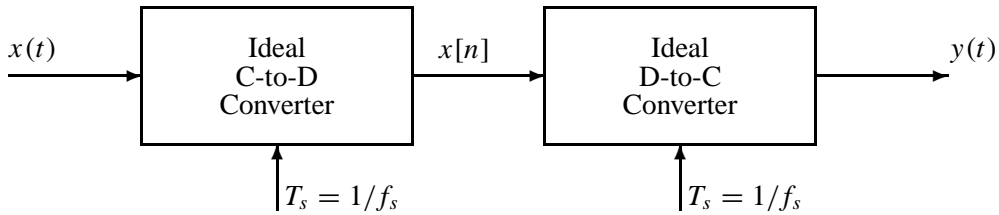


PROBLEM:

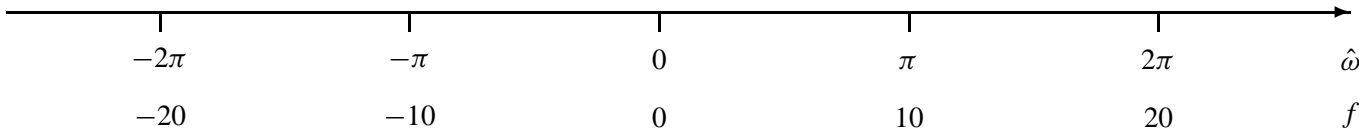
Consider the following sampling and reconstruction system.



where $x[n] = x(nT_s)$. In the rest of this problem, assume that $x(t)$ is given by the formula

$$x(t) = 10 \cos(10\pi t) + 2 \cos(40\pi t + \pi/3)$$

- What condition must be satisfied by the sampling rate, $f_s = 1/T_s$, such that $y(t) = x(t)$?
- Now suppose that $f_s = 20$ samples/sec. Below, sketch the spectrum of the sampled signal $x[n]$ (i.e., show the alias frequencies) as a function of both cyclic frequency for $-f_s < f < f_s$ and normalized frequency $\hat{\omega} = 2\pi f T_s$, for normalized frequencies $-2\pi < \hat{\omega} < 2\pi$. Label the axis carefully.



- What is the output $y(t)$ if the sampling rate is $f_s = 20$ samples/second as in part(c)?

