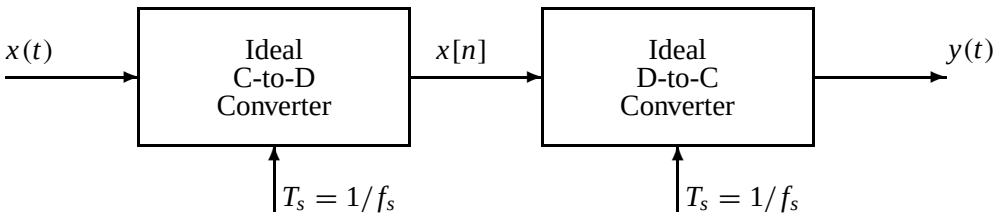
PROBLEM:

Consider the following system.



Suppose that the output of the C-to-D converter is

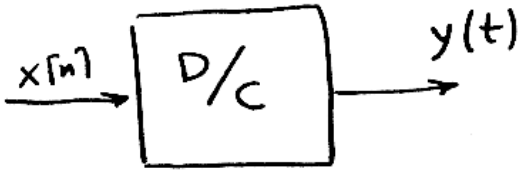
$$x[n] = 5 + 8\cos(0.4\pi n) + 4\cos(0.8\pi n + \pi/3)$$

when the sampling rate is $f_s = 1/T_s = 2000$ samples/second. Determine the output $y(t)$ of the ideal D-to-C converter.

McClellan, Schafer and Yoder, *Signal Processing First*, ISBN 0-13-065562-7.
Prentice Hall, Upper Saddle River, NJ 07458.

SOLUTION

$$x[n] = 5 + 8\cos(0.4\pi n) + 4\cos(0.8\pi n + \pi/3)$$



For discrete to continuous, we replace "n" with $F_s t$

$$y(t) = x[n]\Big|_{n=F_s t}$$

$$= 5 + 8\cos(0.4\pi(2000)t) + 4\cos(0.8\pi(2000)t + \pi/3)$$

$$= 5 + 8\cos(2\pi(400)t) + 4\cos(2\pi(800)t + \pi/3)$$