تمرین فصل چهارم

1. Solve Problem 4.2 Textbook, oppenheim.

2.

The input signal, $x_c(t)$, given by $X_c(j\Omega) = 0, |\Omega| \geq 2\pi\ x10^4$ is subjected to a sampling system, using sampling period T, and having output $x[n]$: $x[n] = x_c(nT_s)$.

The signal $x[n]$ is then subjected to a digital filter, having impulse response $h[n]$, and generating the output $y[n] = T\sum_{k=-\infty}^{n} x[k]$.

a) What is the maximum allowable value of T if aliasing is to be avoided ? (so that x_c can be recovered from $x[n]$) ?

b) What is $h[n]$?

3.

Consider the sampling and reconstruction system given below where $x(t)$ is given by the formula $x(t) = 10\cos(20\pi t - \pi/4) - 5\cos(50\pi t)$

a) What condition must be satisfied by the sampling rate to ensure $y(t) = x(t)$?

b) How should f_s be chosen, so that $y(t) = A + 10\cos(20\pi t - \pi/4)$?

c) What is the value of the constant A ?

4. Solve problem 4.15 textbook, oppenheim.

5. Solve problem 4.16 textbook, oppenheim.