

Problem 7.31

We modify the script of Problem 7.30(a) by replacing

Pulse Shape = ones(1,Fs); % rectangular pulse shape

With the lines

B0 = 0.5; % (Hz)

t = [-2.001: 1/Fs : +2.001] % time scale for pulse shape

rcos = sinc(4*B0*t) ./ (1-16*B0^2*t.^2); % from Eq.(6.20)

Pulse Shape = rcos;

Doing so, we obtain the graphs plotted in Fig. 1. The top graph of the figure shows the time-domain version of the bandpass signal, including the amplitude modulation that occurs with raised cosine pulse-shaping. The bottom graph of the figure shows the raised cosine spectrum of the transmitted signal. Presence of the effects of aliasing is evident in the plot due to the spurious signal present at 0 Hz in the magnitude spectrum.

If we make changes similar to those of Problem 7.30(b), then we obtain the plots shown in Fig. 2. The top graph of the figure shows the baseband *I*-channel consisting of a random data stream with raised cosine pulse shaping. The bottom graph of the figure shows the magnitude spectrum of the complex baseband signal. There is no evidence of significant aliasing effects in this figure. The effects of aliasing are less evident in the raised-cosine case, because the spectrum is much more constrained than it is with rectangular pulse-shaping.

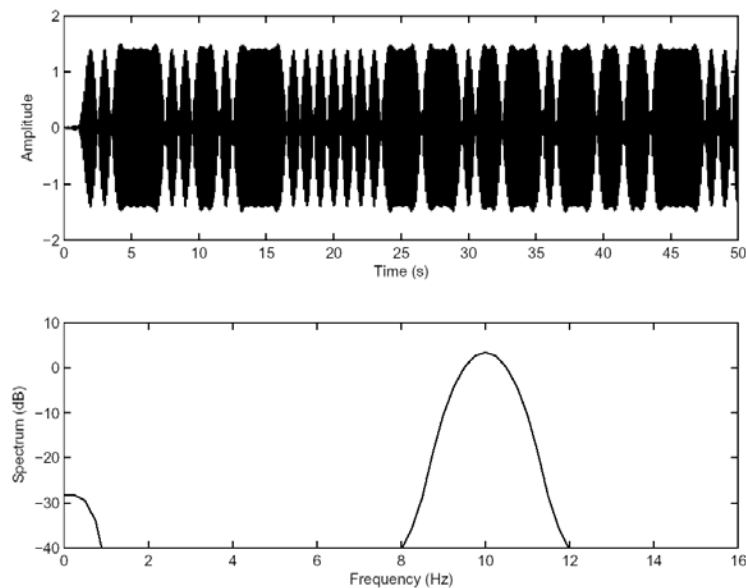


Figure 1

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Problem 7-31 continued

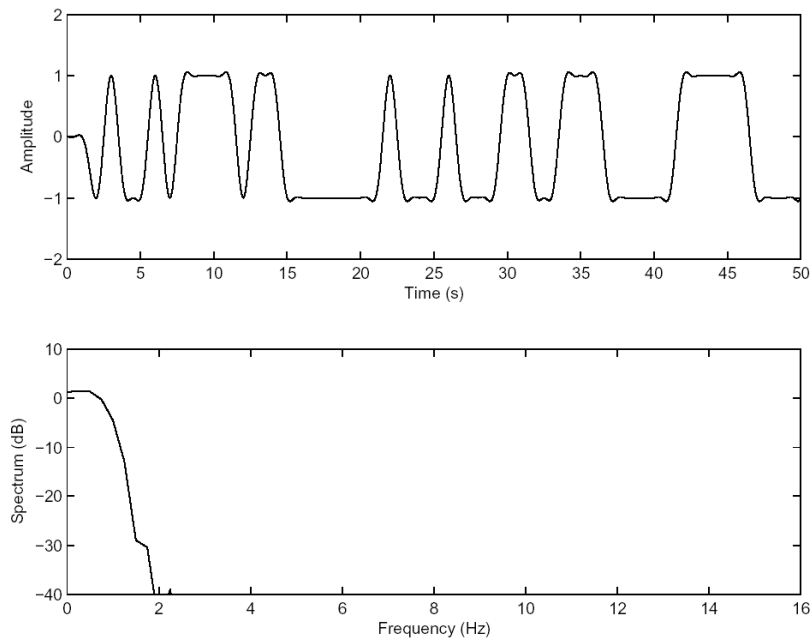


Figure 2