

Sampling Theorem Report and Grading Format

1 Report Format

1. Briefly explain what you did in the lab
2. Show the Results/plots, you can use excel or a snap shot or draw it by hand.
 - (a) The Sampling Theorem Handout: T2, T3, T4, T5, T6, T7, T8, T10, T12, T13, T17, T18, T19, T20.
 - (b) Sampling With Sample and Hold: T3, T4, T5, T6, T7.
3. Matlab Code (print the code with the report and also submit the .m file on Sakai, please save it as sampling_yourname.m)
 - (a) Sample a 2KHz sinusoid signal, show the original signal and the sampled time domain signals. And also plot the magnitude spectrum.
 - (b) Pass the 2KHz sinusoid signal through a 5 KHz Low Pass Filter. Show the original time domain signal and the spectrum.
 - (c) Pass the sampled 2 KHz sinusoid signal through a 5 KHz Low Pass Filter. Show the spectrum. Justify the result
 - (d) Write a matlab code to find the Minimum Sampling Rate. You can work with any kind of the signal you like. For example: you can choose a 10KHz Sinc/square wave, find the min. sampling rate f_{smin} . Show time domain and magnitude spectrum for $f_s < f_{smin}$, $f_s = f_{smin}$, $f_s > f_{smin}$.
 - (e) MDSDR: Generate a 3KHz sinusoid signal (4V) and a 4KHz sinusoid (close to 0V). Add them as shown in Figure 5. Increase the amplitude of 4KHz wave, when do you notice the presence of this signal. Show the plots (time domain and spectrum).
 - (f) EXTRA CREDIT: Use a 2KHz sinusoid, plot the magnitude spectrum in a dB scale for $N = 2^{12}, 2^{14}, 2^{16}$. Is there a difference, if so why, if not why not.
 - (g) EXTRA CREDIT: In matlab generate a pulse train as shown in Figure 1 of the handout. Use this pulse train to sample a 2KHz sinusoid. Show the sampled time domain signal and the corresponding magnitude spectrum.
4. Answer the following questions
 - (a) Tutorial Questions Q1, Q2, Q3 in the Sampling Theorem Handout.

(b) Tutorial Questions Q1, Q2, In the Sampling With Sample and Hold Handout.

You can work in groups but everybody should submit an individual report. As always feel free to write any other comments.

If you have any other questions, you can stop by the lab Kelly 201.