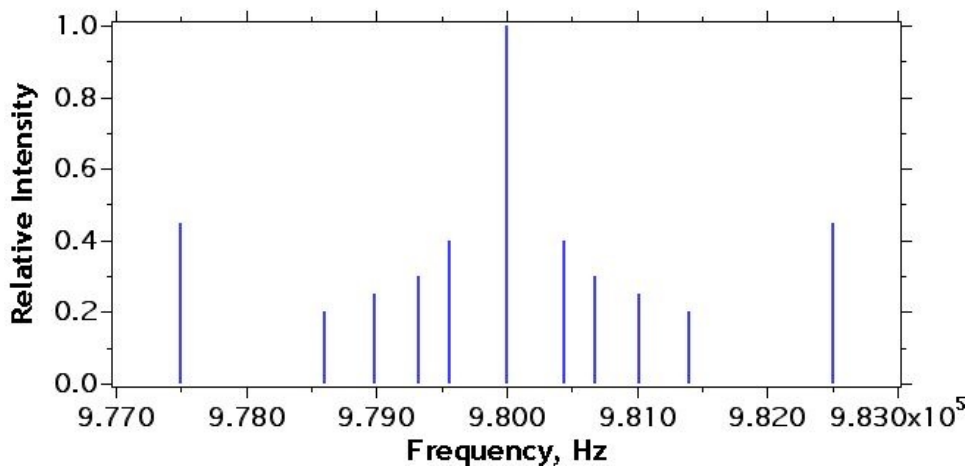


# Homework #7

due Tuesday April 1

1. Download the files FourierTutorial.doc and SqWave.xls and fill out Part I of the tutorial. (Don't do Part II about the electron.)
2. Consider the example of the square wave shown in Figure 13.4 of your book. We derived the Fourier series for this wave in class. Find the Fourier series for this wave if it were shifted up and to the left so that the maximum were 2 and the minimum were zero, and the first peak was centered on  $x=0$ , so that the first peak starts at  $-\pi/2$  and ends at  $\pi/2$ . Write an explanation for your answer.
3. Hirose & Lonngren Chapter 13 #3.
4. Hirose & Lonngren Chapter 13 #2.
5. The Fourier transform (frequency spectrum) of a periodic function is shown in the figure below.
  - (a) Estimate the frequencies and relative intensities from the graph and write the waveform as a Fourier series (assume all components are cosine functions).
  - (b) If you want to measure the waveform that corresponds to this signal for a limited amount of time, what is the smallest amount of time you can measure and still capture most of the information in the signal?



6. Write the Fourier series and draw the Fourier spectrum of the following waveform.

