Chapter 2
Since this is about the last point in a window I won't go into all the details of window design.

A brief overview of why we use windows.

When sampling a continuous signal we use an A/D converter to digitize it, then store a sample in memory. If you then do an FFT of the sample you get a frequency representation of the original signal.
The problem is that the Fourier transform wants a signal that is constant from minus infinity to positive infinity. The FFT assumes that the sample is repeated over and over again from minus to plus infinity. This normally produces discontinuities at each end of the sample. The results of the FFT then have the FFT of this discontinuity mixed in with the FFT of the signal.

The different windows are designed to overcome (reduce) the effect of the discontinuities. To make a long story short, some windows are designed so that their first and second derivatives are zero at each end. So the discontinuity is at the ends and the design of the window is specifically about the ends.

Now for some examples

The rectangular (boxcar) window is all ones so when you put it end to end you still get all ons, and there is no problem.

Triangle Window

(In Octave it is a Bartlet window not the triang window.)
The triangle window is 0 1 2 3 4 5 4 3 2 1 0 ## yes I know that this will amplify the signal
when you put this end to end you get: ## just using these numbers because it is easier
3 2 1 0 0 1 2 3 4 5 4 3 2 1 0 0 1 2 3 4 5 4 3 2 1 0 0 1 2 3 4 5 etc. ## to see.
you should get:
3 2 1 0 1 2 3 4 5 4 3 2 1 0 1 2 3 4 5 4 3 2 1 0 1 2 3 4 5 etc
Or more properly to keep the same length you should get this:
0.0 0.9090 1.8181 2.7272 3.6363 4.5454 4.5454 3.6363 2.7272 1.8181 0.9090 0.0 0.9090 1.8181 2.7272 3.6363 4.5454 4.5454 3.6363 2.7272 1.8181 0.9090 0.0 0.9090 1.8181 2.7272 3.6363 4.5454 4.5454 3.6363 2.7272 1.8181 0.9090

The Problem Defined

The FFT of these three sequences are different. If you draw a graph of these two signals you will see a flat spot between each of the triangles for the first signal. This flat spot is the problem!. You have told the FFT that there was no signal for one complete sample period.

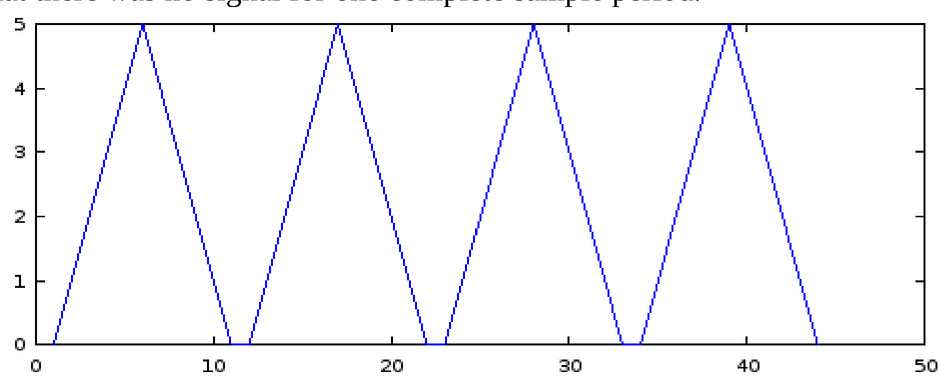


Fig.#1 Sequence 1 repeated.

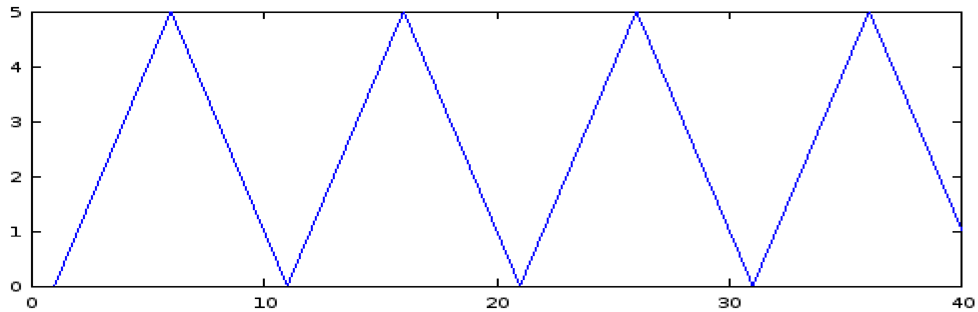


Fig #2 Sequence 2 repeated.

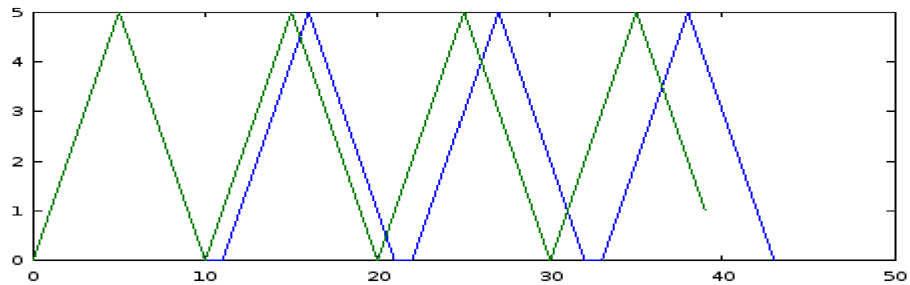


Fig #3 Sequence 1 and 2 repeated.

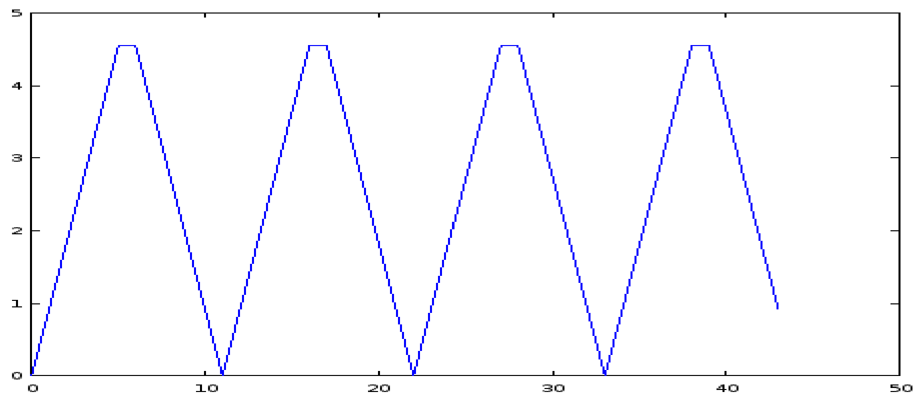


Fig #4   Sequence 3 repeated

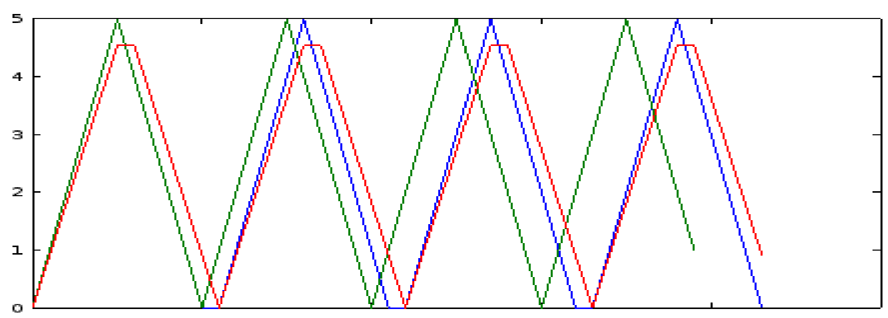


Fig #5 Sequences 1,2 and 3 repeated.

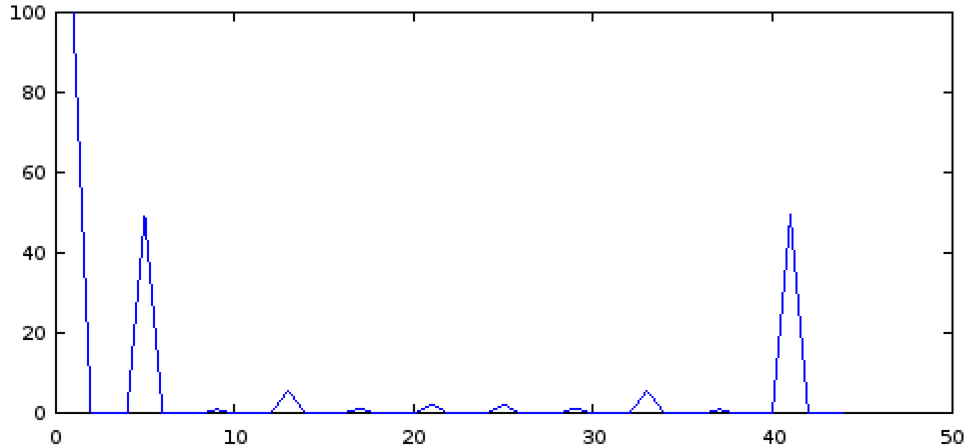


Fig. #6 FFT of sequence 1 repeated.

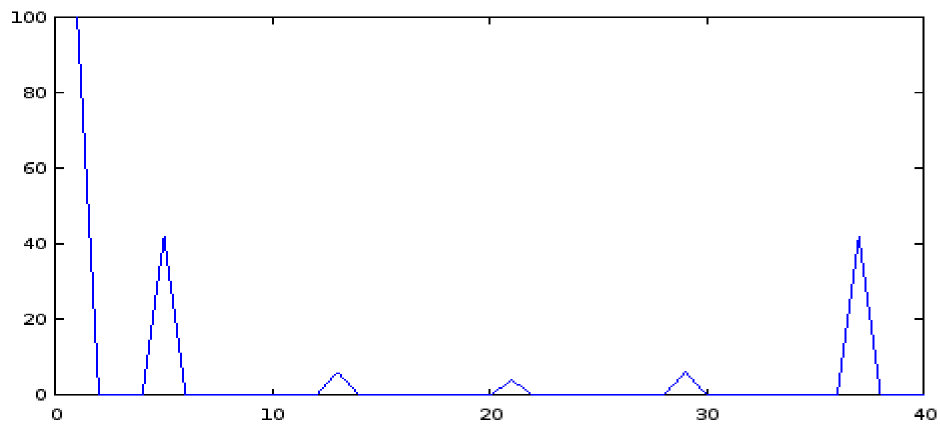


Fig. #7 FFT of sequence 2 repeated.

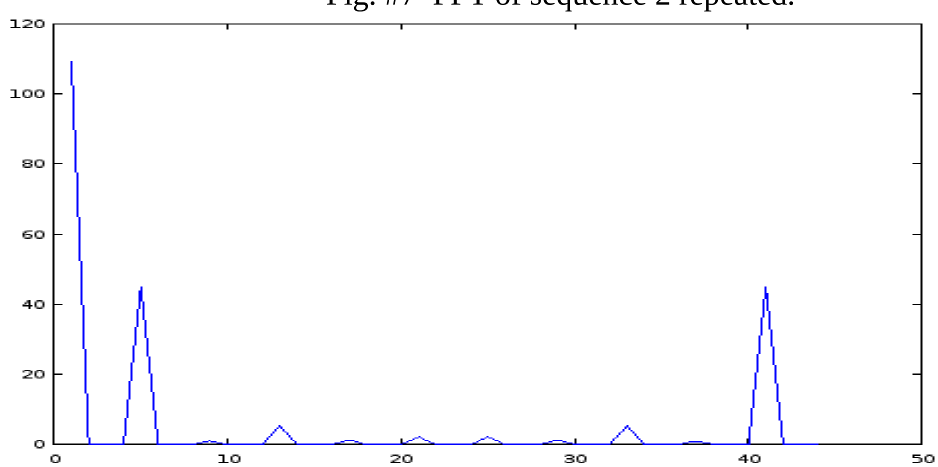
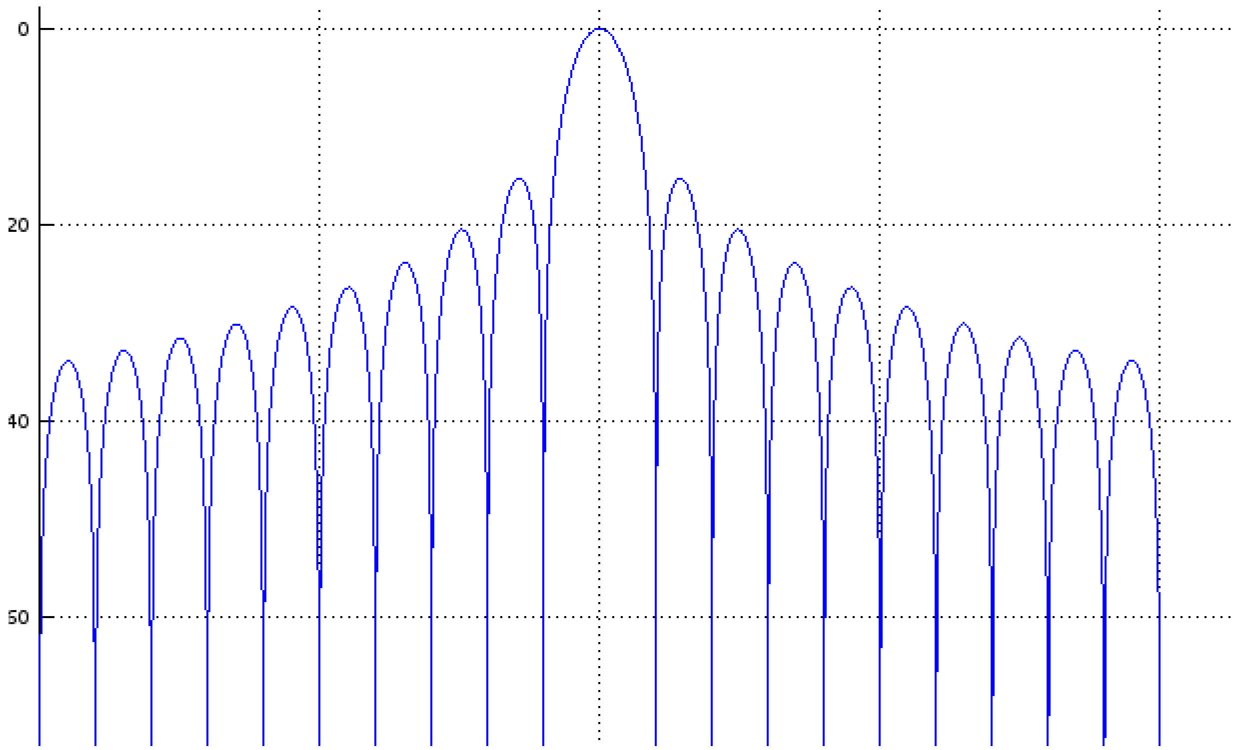


Fig #8 FFT of sequence 3 repeated.

Chapter 3 will be about the Fourier transforms of the different windows.



FFT of the Boxcar window