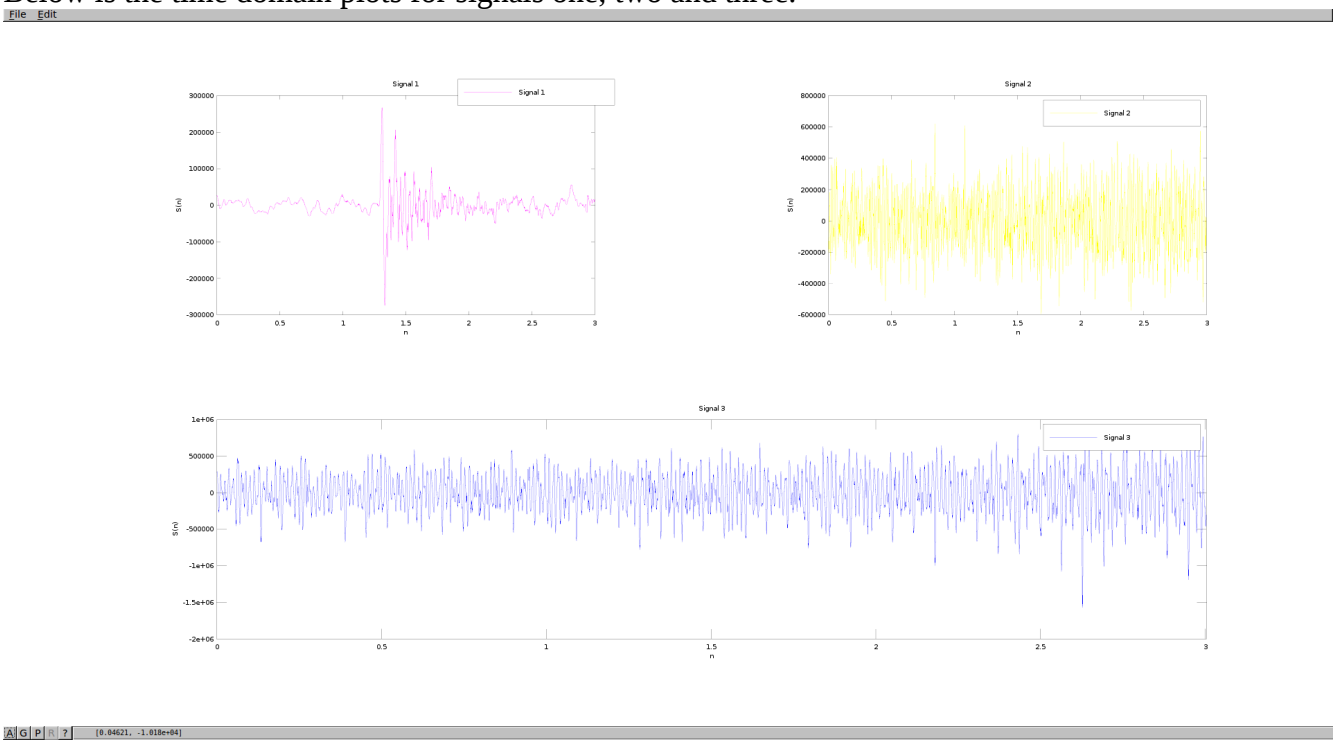
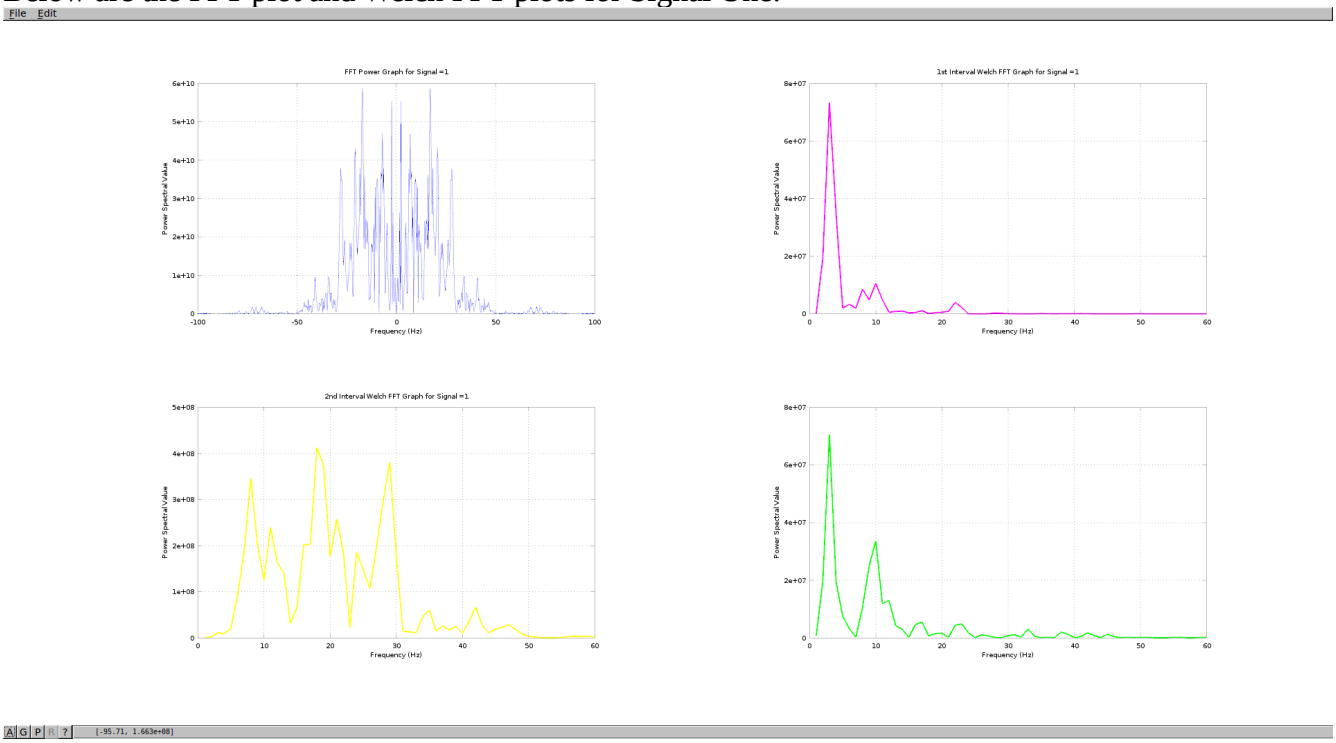
John Lasheski
November 15, 2014
Signal Project

Below is the time domain plots for signals one, two and three.

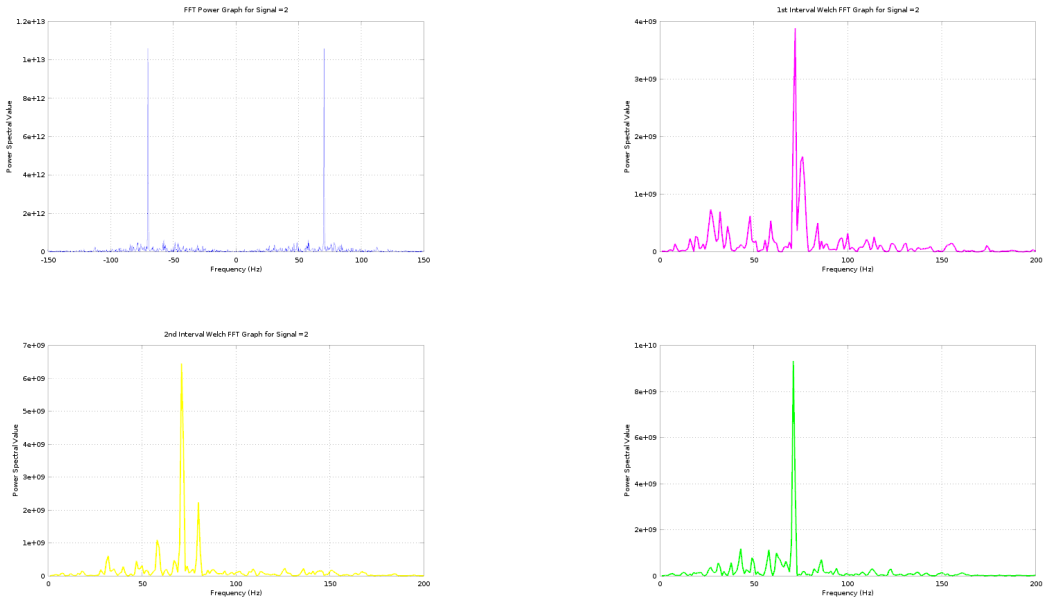


Below are the FFT plot and Welch FFT plots for Signal One.



Below are the FFT plot and Welch FFT plots for Signal Two.

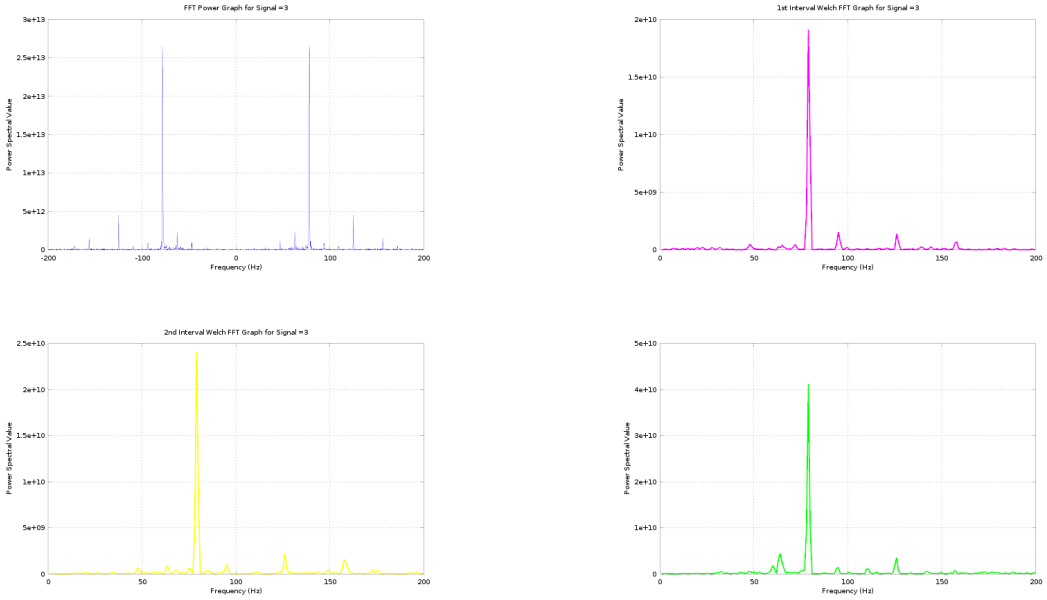
File Edit



A G P R ? [-336, 1.925e+10]

Below are the FFT plot and Welch FFT plots for Signal Three.

File Edit



A G P R ? [-180.8, 6.197e+10]

Analysis.

It seems like signal one has a lot going on. From looking at the time domain plot it would appear that the sounds was created by an abrupt event. There is no sound at first and then it builds rapidly, before falling away. This would suggest something like a drum or a gun shot created the sound. Looking at the FFT plots for signal one agrees with the time domain analysis. The frequency components are all very low. It is interesting to note the number of frequencies that develop in the second interval. Specifically how the 8 Hz 18 Hz, and 29 Hz frequencies show up before trailing off again in the third interval.

I think signal two could have been generated by a musical instrument of some sort. Looking at the time domain the signal seems to remain fairly consistent over time. This looks to me like someone pressing a key on an organ and holding it down for three seconds. Furthermore, when looking at the signal in the frequency domain the spectrum is very tight. There are not many overtones and the bulk of the energy appears to be centered at 70 Hz. With that said, it is interesting to note the small secondary frequency observable in the first and second Welch intervals. It starts around 75 Hz in the first plot and moves to 80 Hz in the second. It does not appear at all in the third plot. I am not sure what could have caused that.

Signal three also appears to remain consistent over time. If I had to guess what made signal three I would think possible the male voice. I found on line that the male voice is around 80 Hz. Signal three has the bulk of its energy at 78 Hz. There are a few smaller components at 125 Hz and 150 Hz. As with the time domain, this signal remains consistent over the three subplots in the frequency domain as well.