T9 Text Decoder

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I. Introduction

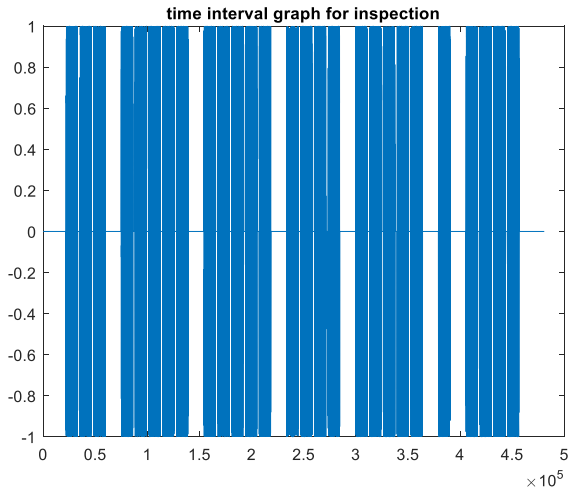
In this computer assignment we were given an audio clip of the tones of numbers that were pressed that created a cryptic message. Using the clip we determined the two frequencies associated with each button press which are unique to a number on a telephone. Each number have letters assigned with them that we used to decode the message.

II. Methods

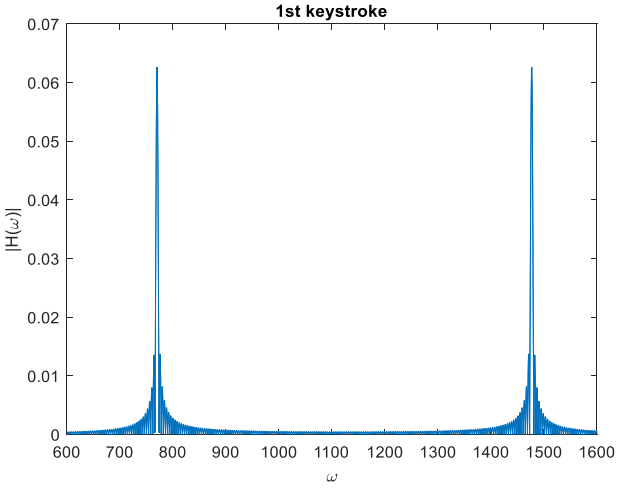
The method to decode the message began with plotting the audio clip data that was given. The plot of this data showed the buttons being pressed with their magnitudes and the time. We then started by taking the Fourier Transform of the audio clip, plotted them, and understood that we needed to separate each button to determine their unique frequencies. Within the original plot of the audio clip we zoomed in for each button and received an interval. Using these intervals, we used the myFFT function and plotted each of the twenty seven buttons and had the two frequencies per plot. We then used the wikipage to see which two frequencies we assigned for each number. After all the numbers were retrieved we used a T9 emulator to decode the phrase.

III. Results

When plotting the audio clip data "X", this is the plot that is produced. The spaces between words are clear and in white. The long blue bars and the buttons being pressed. We used this plot to determine the intervals in which we would use the myFFT function for.



When using the myFFT function on the first interval, which is the first number pressed, then plotting it we would reach this result. The highest magnitudes contain the frequencies in which we are looking for. We ended up with twenty seven of these plots and it iseasy to see which frequencies were being used for each button.



As an ending result, the numbers that we retrieved were 668, 38379,78737,4376,93277,2,2273 which are spaced like the original plot. The hidden message was "NOT EVERY SUPER HERO WEARS A CAPE".
https://www.sainsmograf.com/labs/t9-emulator/

IV. Discussion

This computer assignment justified our understanding the the Fourier transform and what is can be used for. We also realize hardcoding twenty seven plots and placing data points at each ymax was not the most efficient way to retrieve the frequencies. It is challenging to create a loop on different intervals that are not evenly spaced.