CmpE 362 Homework 2 Report

Berkay Kozan

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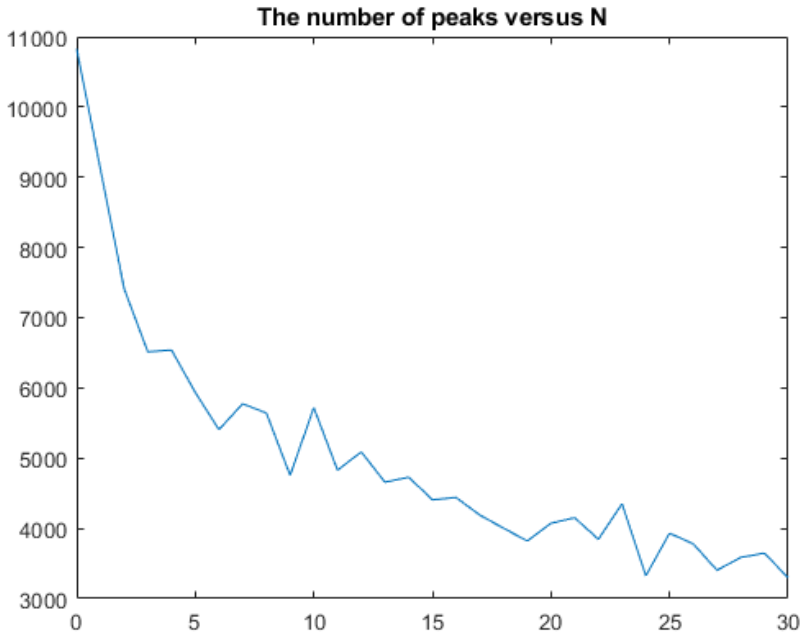
1 Question 1



When N is equal to 0, it indicates that the unfiltered peaks. We can simply see it from the graph, when the number of samples increases, that the number of peaks generally decreases. The code for question 1 works if there is "exampleSignal.csv" that contains the signal in the same folder with code.

2 Question 2

In this section I listened different versions of "laughter.wav". In first version, it is totally normal, so one hears a clear laugher of a group.

After first pitch change, the laughter happens 2 times faster and the voices are thinner. We can understand that it is a laughter.

After we change the data, to quadruple the frequency, the laughter happens 4 times faster than normal, and the voice sounds the thinnest of all. It is almost impossible for us to say it is a laughter.

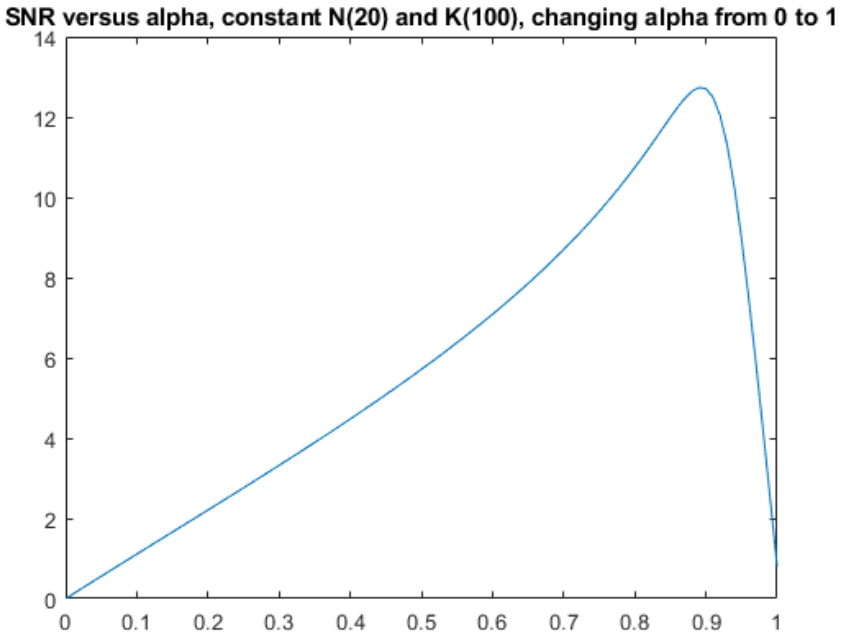
After we change the data, to half the frequency, the laughter happens 2 times slower than normal, and the voice sounds really deep. We can clearly understand that it is a laughter.

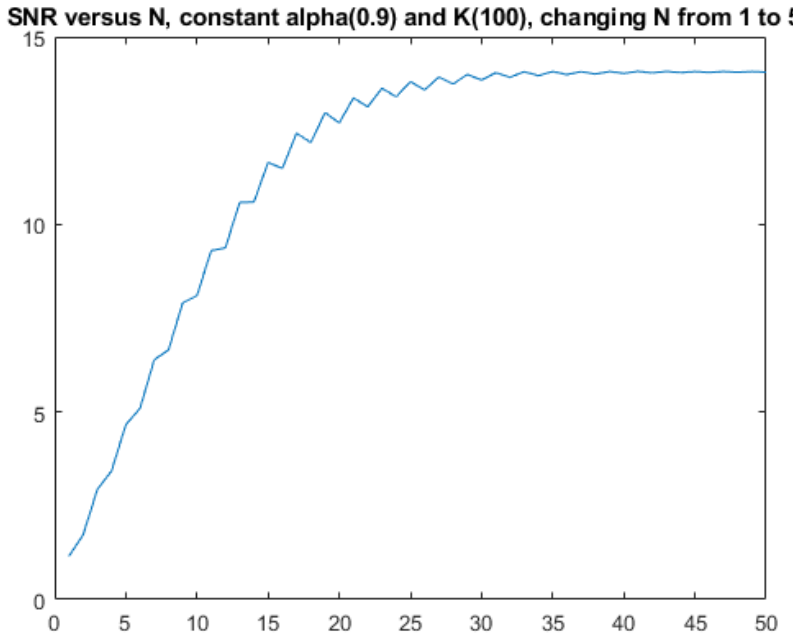
When we double Fs, the voice sounds really thin, it sounds like the version after first pitch change. It is 2 times faster than normal, and the voices are thinner. We can understand that it is a laughter.

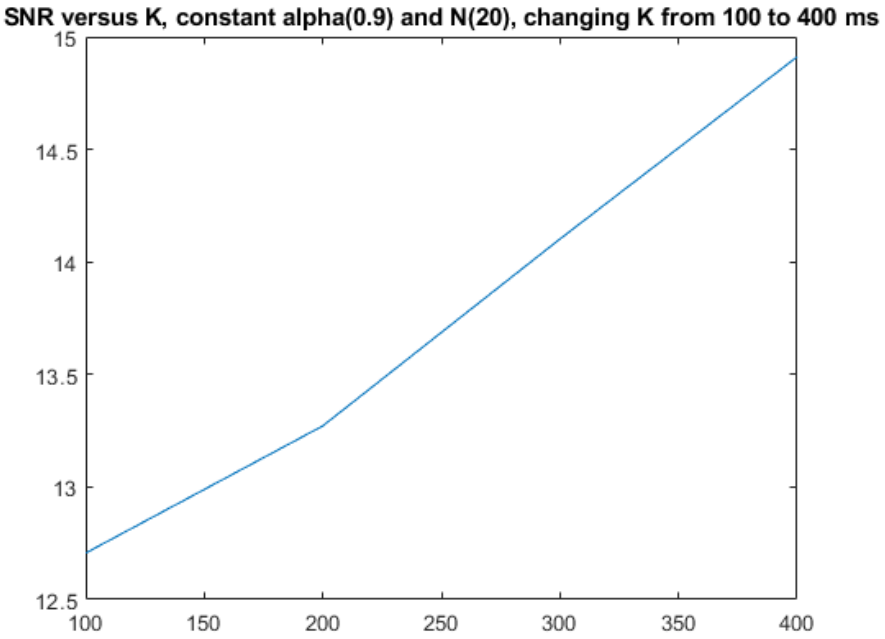
When we divide the Fs by 2, the laughter happens 2 times slower than normal, and the voice sounds really deep. We can clearly understand that it is a laughter.

3 Question 3

In this question, I implemented a N-tap filter. The SNR values are calculated for different scenarios, given below. The results are for specific constants, it changes if you change constants.







From the graphics above, we can conclude that: When you increase alpha with constant K and N, the SNR has a peak point. Until the alpha that gives

SNR peak value, SNR slowly increases, with a relatively constant slope. After peak, it sharply decreases.

When you increase N with constant alpha and K, the SNR value generally increases. If N is an odd number, the increase is really high. When N is an even number, the SNR doesn't increase. It may increase, decrease or stay the same.

When you increase K with constant alpha and N, the SNR value increases, with a relatively constant slope.