

Assignment 3 - 20171213

Q1:

1. Coeff = > a= 142, b= -6362 , c= 77731

$$\text{Ans} = > 15069.47*a + 4*b + c = 2.1896e+06$$

2. Earlier norm was 1.2557e+05, and after normalizing it is 1.3289 . So, yes it helped.
3. Yes, it is passing :) and in matlab with an error of 1e-10
4. No, it is not possible as complexity is very high !!

Using formula => $\text{inv}(\text{transpose}(a)*a)*\text{transpose}(a)*z$

Where A = > 1e6 x 1e6 and z = 1e6 x 1

Q2:

1. Yes, these two things doesnt correspond to each other. As shown in part2.
 2. Avg = 4.5591e+16 Ofcourse it's a high value as it doesnot correspond.
 3. Avg = 2.7976e-15 (when zero padded) It clearly shows that both are same :) as the error is very very less i.e order of 10^{-15}
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Q3:

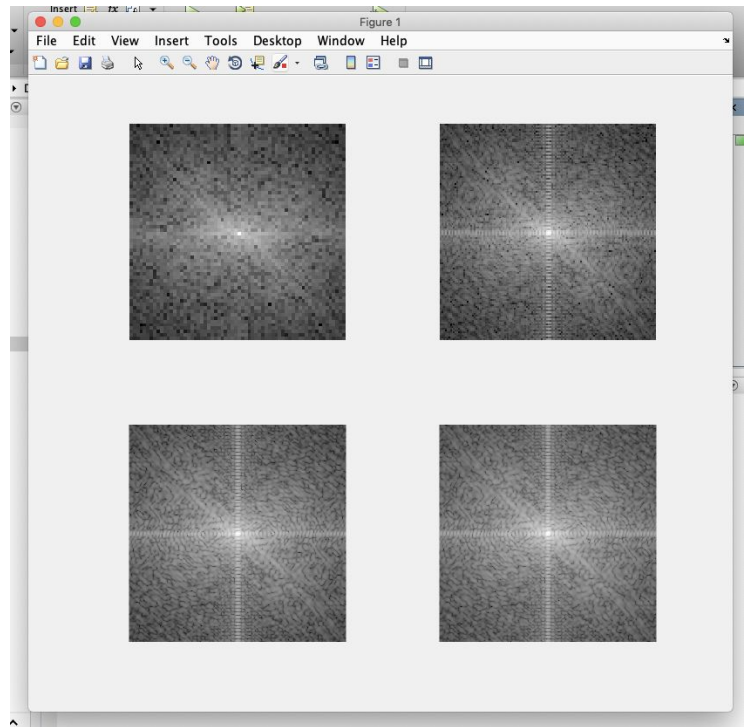
here , (1,1) => 64x64

(1,2) => 128x128

(2,1) => 256x256

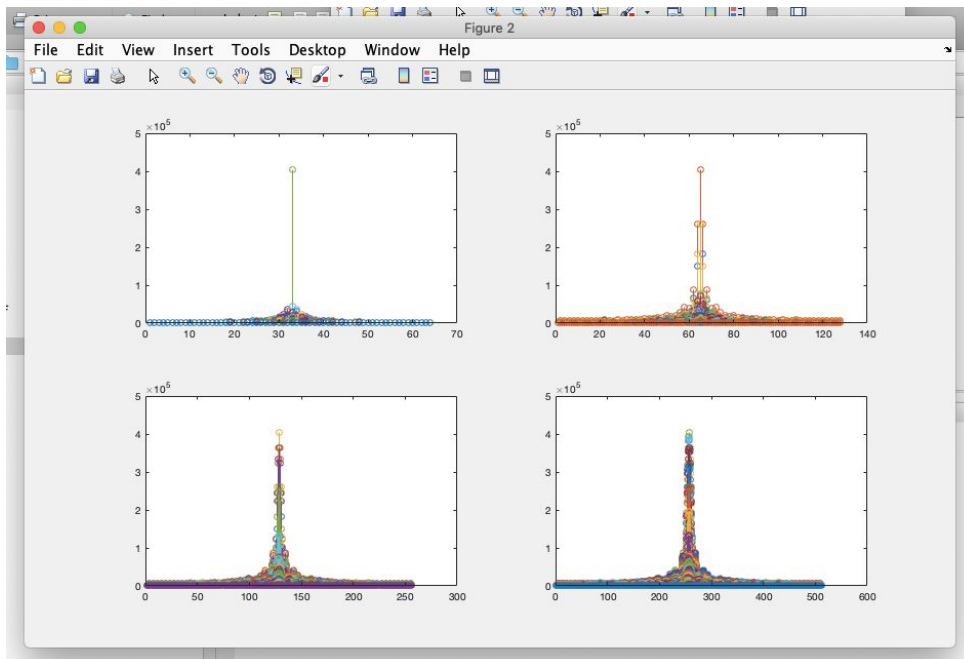
(2,2) => 512x512

Simply padding the signal , creates abrupt change in signal and hence noise is generated as the padding increases, more noisy frequencies are generated



and hence shown on the left <<--

Earlier it was clear :)



Q4:

The frequencies are \Rightarrow 882 hz , 1320 hz

For this I calculated fft, and after find 2 frequencies (having maximum altitudes), as it is fft, there is repetition of same abs value twice . Hence 3rd max correspond to 2nd max freq (i.e. 1320hz) :)

After finding these frequencies, I just removed the contribution of other frequencies in the fft domain and took inverse-fft to get denoised sound .

Q5:

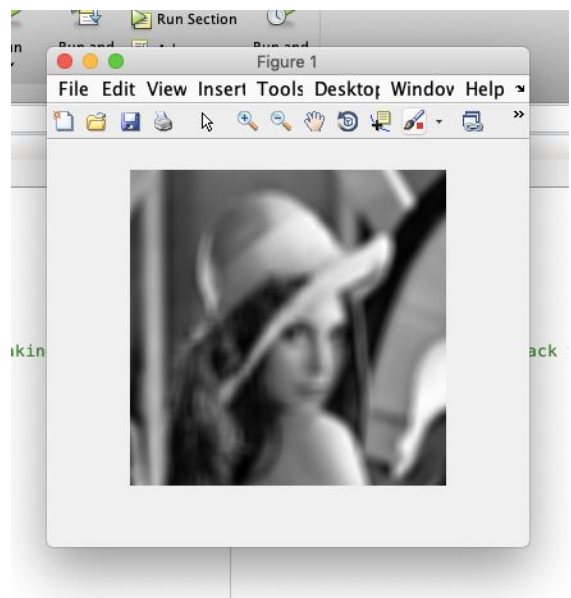
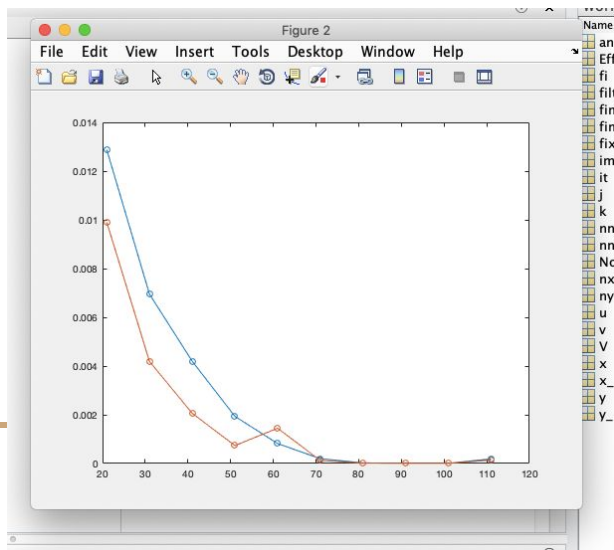
2. In this to find the correct order of the udp packets, correlation (normalized) can be used to find the correlation between the starting window (of 5s) and the ending window to maximise it and hence assuming it to be in place,

By doing this 4 came out be the last udp packet as its correlation was the least .

Q6:

1. Simply implemented using `im2col` , `col2im` (for dealing with widows of length " k x k "

For example : $k = 10$



2.

Here red represents (efficient)

X axis => k

Y axis => time

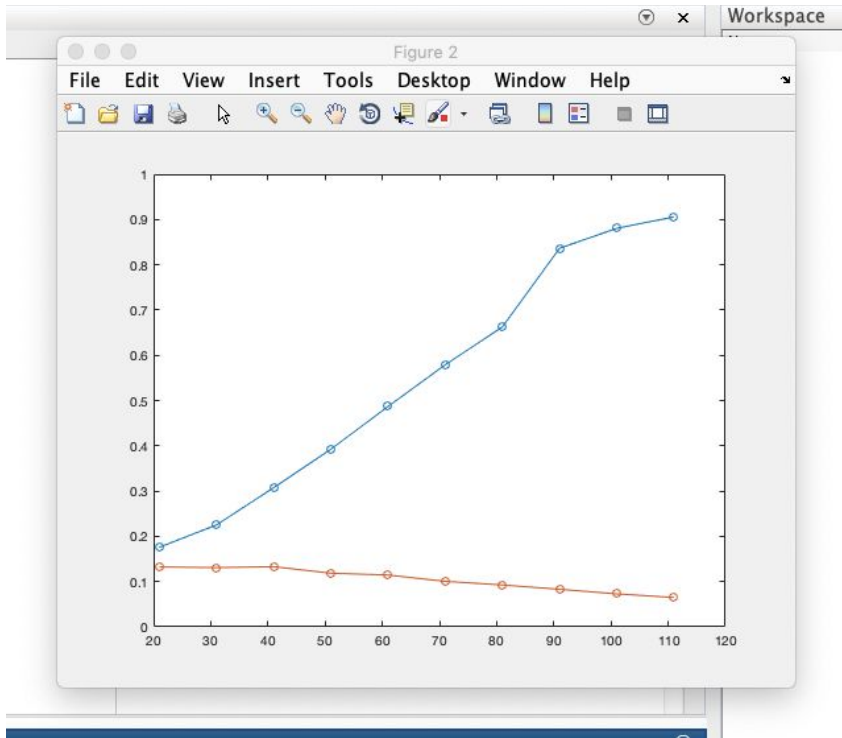
64x64 size pic

Here red represents
(efficient)

X axis => k

Y axis => time

256x256 size pic



Q7:

I used gradient descent and took different values of alpha and number of iterations to come to a combination of

alpha = 2.3640×10^{-4} , and as far as error is concerned, I took mean of abs(difference) for (the remaining 10% data) that and it came out to be 151.1104 (which was the best I could get by changing values).

By increasing alpha from this value, the values were diverging.