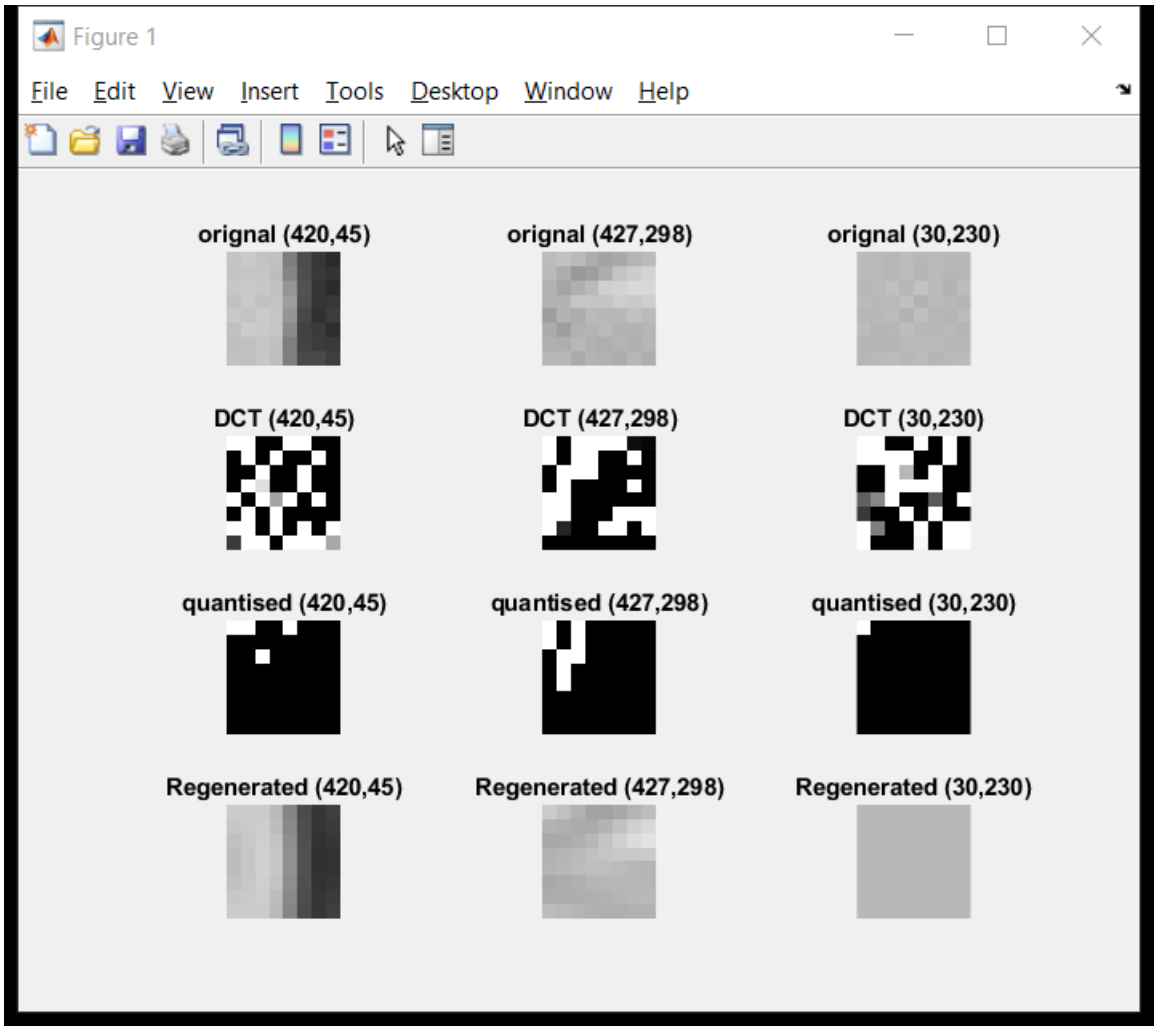
Assignment 4 Report

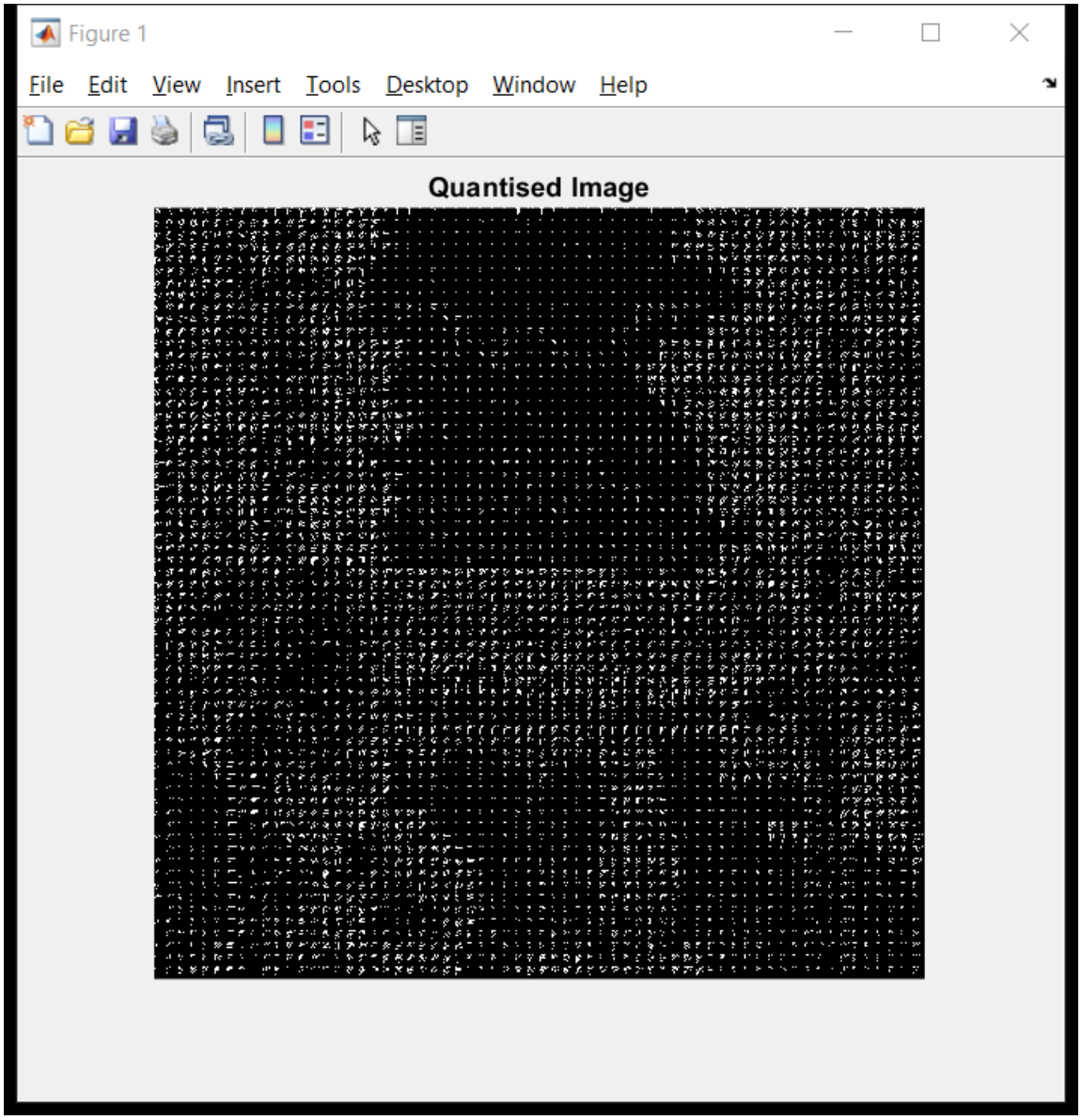
Q1-2)



Here we see that there are 3 8*8 windows of the image 'LAKE.TIF'.For the window from (420,45) we get that data is left after quantisation so reconstruction is perceptible same is the case with window starting from (427,298).Now with third window (30,230) we get that after quantisation little data is left so regeneration is not accurate enough.

This may be due to that data is in yr band of vision.

Q1-3)



Here after quantisation of all 8*8 windows we get most of the data as 0 so we see in image.The white and gray shades are of the data points still valid.

Q1-4)

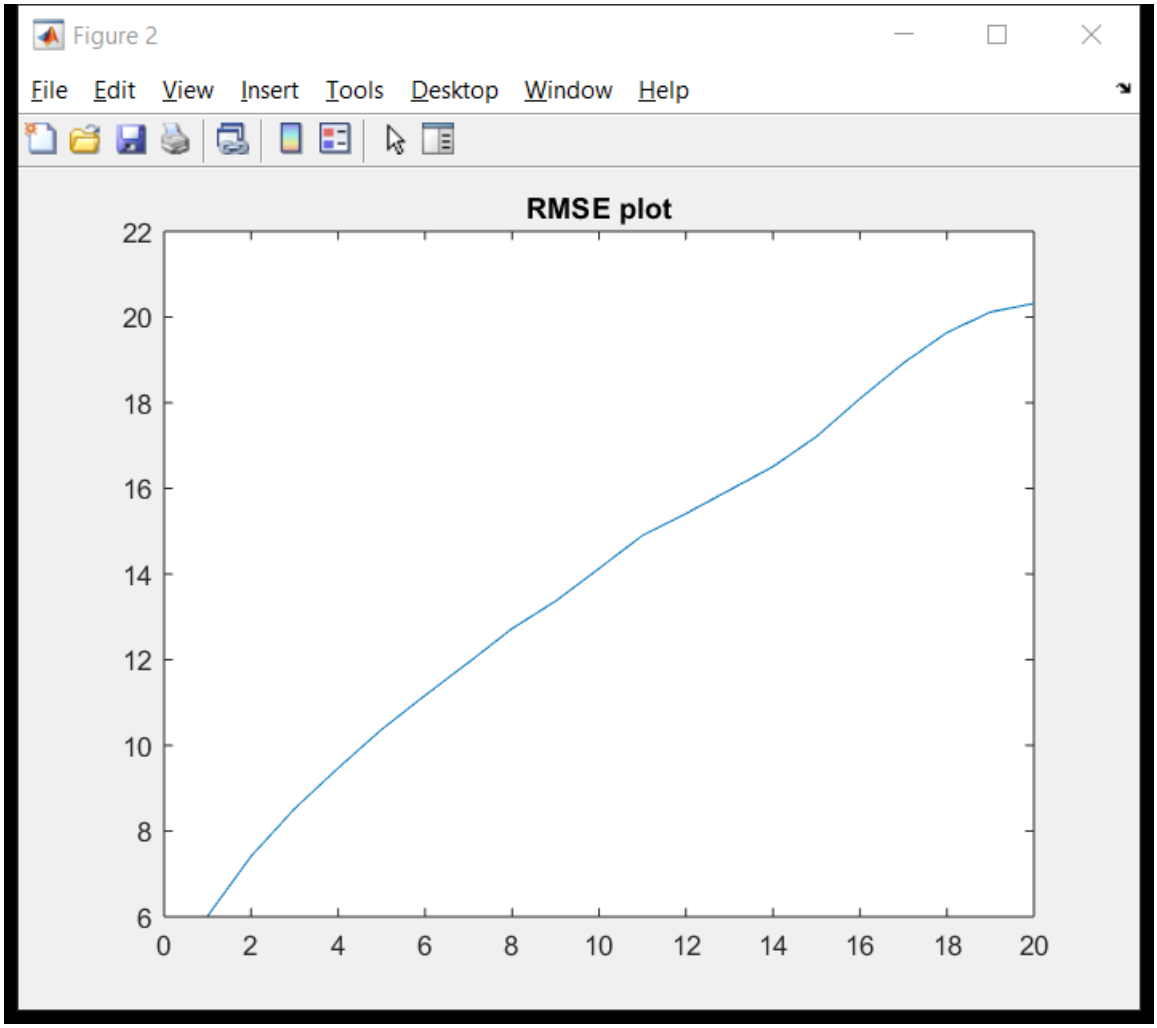


Figure 2
File Edit View Insert Tools Desktop Window Help
RMSE plot
22
20
18
16
14
12
10
8
6
0 2 4 6 8 10 12 14 16 18 20

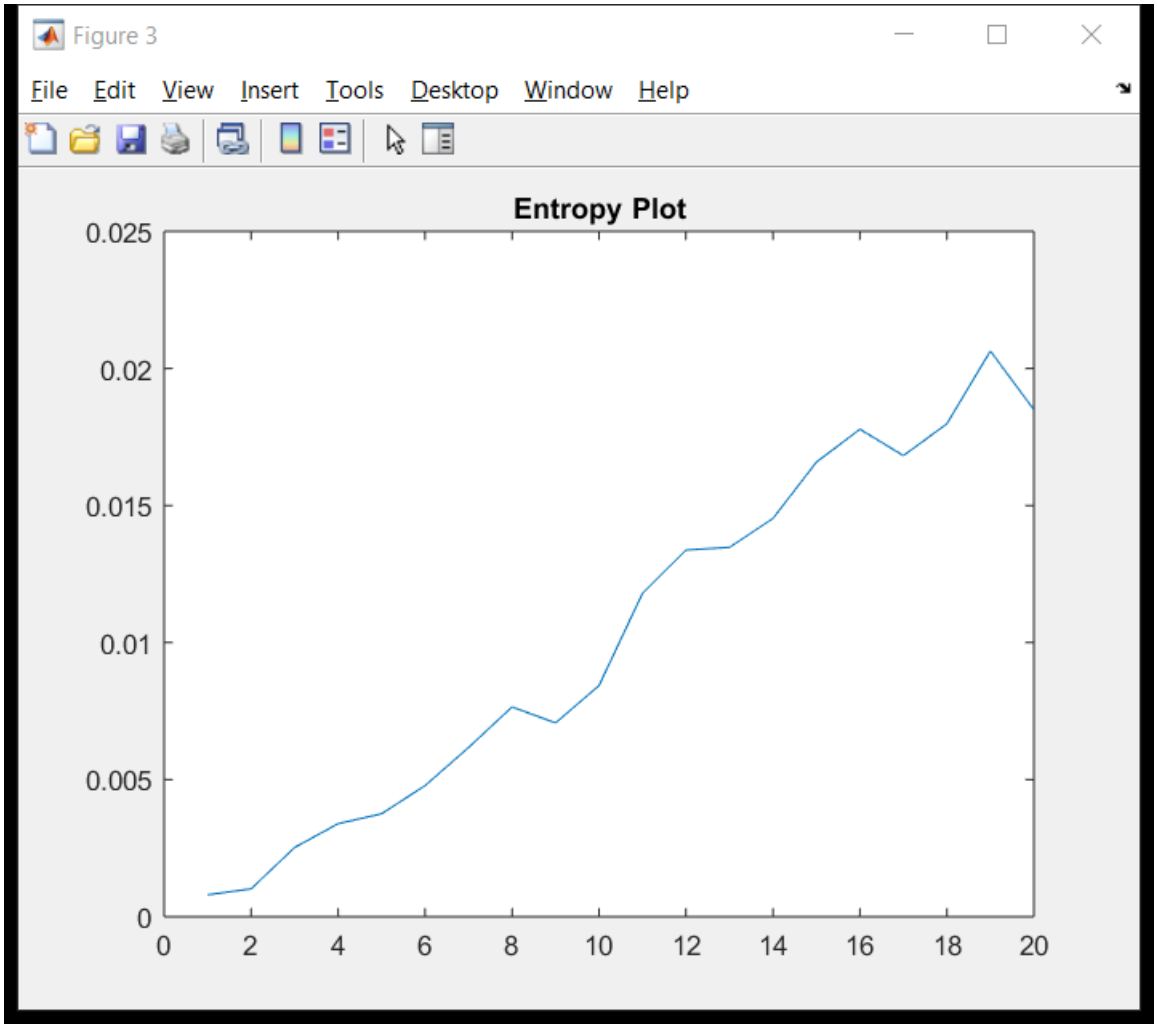
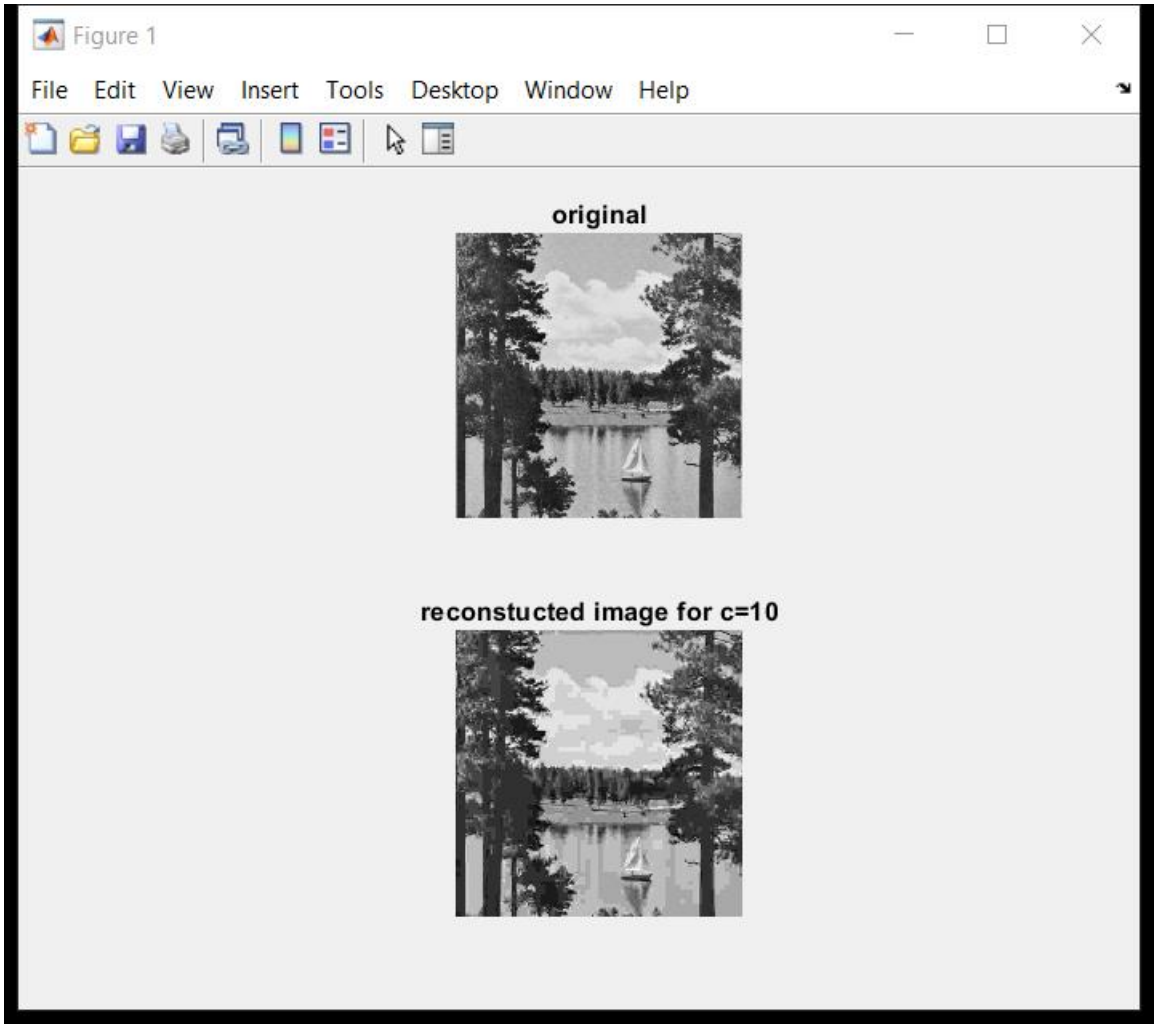


Figure 3
File Edit View Insert Tools Desktop Window Help
Entropy Plot
0.025
0.02
0.015
0.01
0.005
0
0 2 4 6 8 10 12 14 16 18 20



Here for c=10 we get perceptible image. For this case most of the redundant values tend to 0 hence we get good compression and also minimal losses.

Q2)

I have used the pca along with eigenfaces algorithm. I have created a single array with all the images and then found the mean image. Subtracting the mean image I get a matrix A then we covariance matrix is A.A'. But it gives memory error so I first found eigen values and vectors of A'.A. Then we get eigen values of A'.A = A.eigenvectorsof(A.A'). Using this result we then sort according to values and pick top 95 for principal components as we get 90% of variance covered.

Now for reconstruction out of 35 components we find the eigenfaces and then multiply by principalvec'. This gives the reconstructed image.

ORIGINAL

So after reconstruction at top 100 we get

Now for reconstruction at top 35 we get

So we see there is error in reconstruction from 35 components as the variance covered is about 75% only.

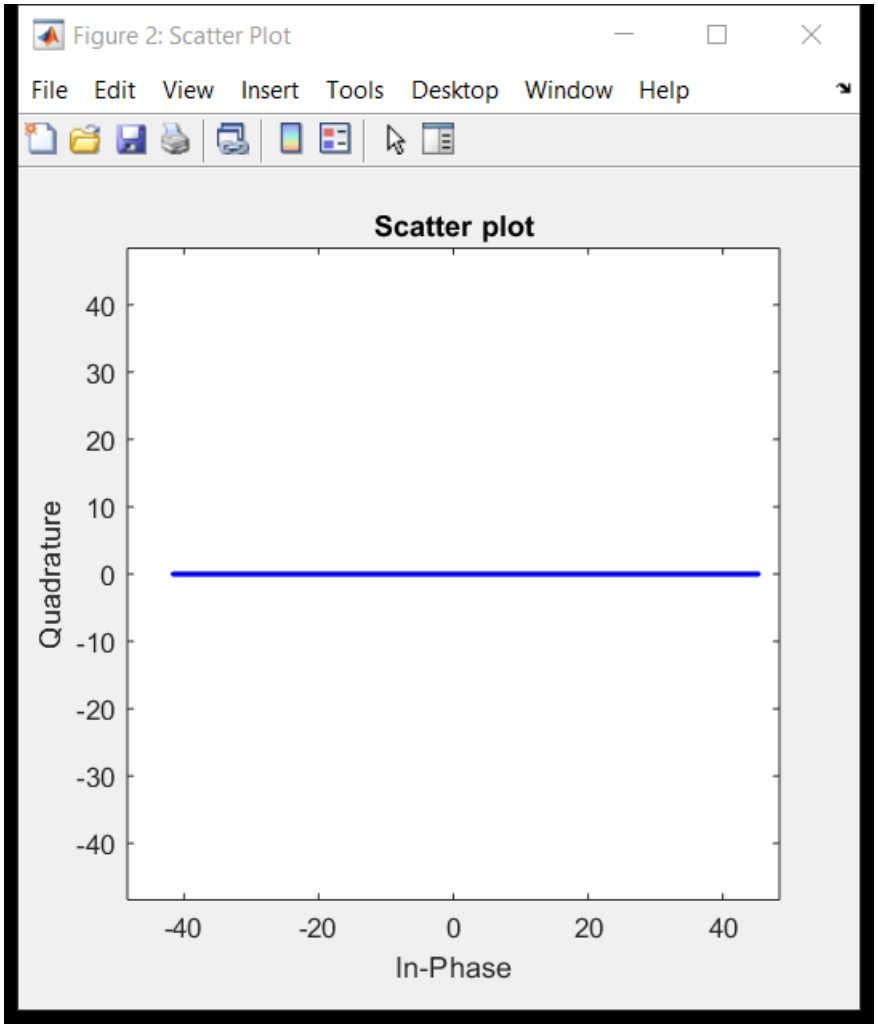


Figure 2: Scatter Plot
File Edit View Insert Tools Desktop Window Help
Scatter plot
Quadrature
In-Phase
40
30
20
10
0
-10
-20
-30
-40
-40
-20
0
20
40

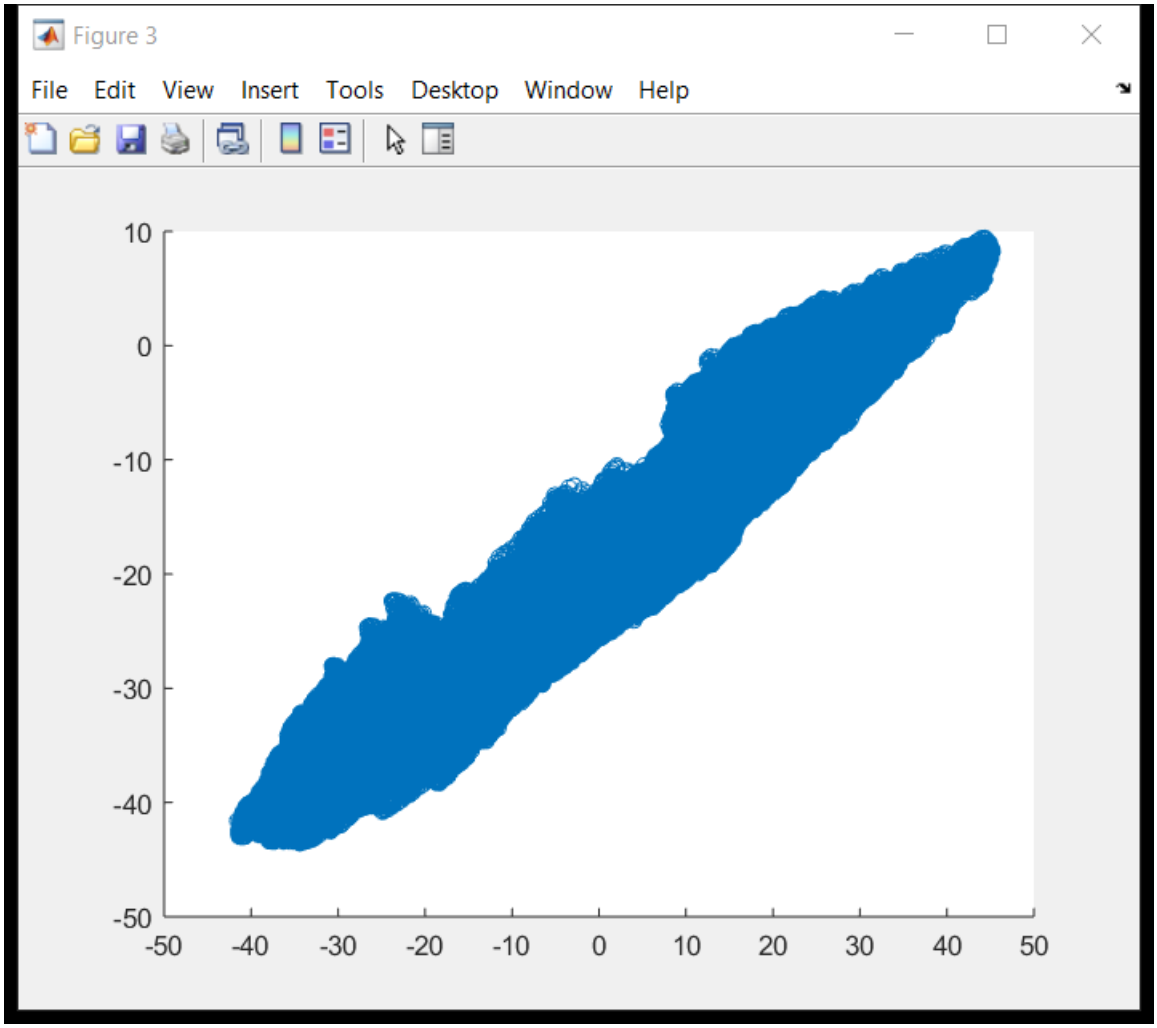


Figure 3
File Edit View Insert Tools Desktop Window Help
10
0
-10
-20
-30
-40
-50
-50 -40 -30 -20 -10 0 10 20 30 40 50

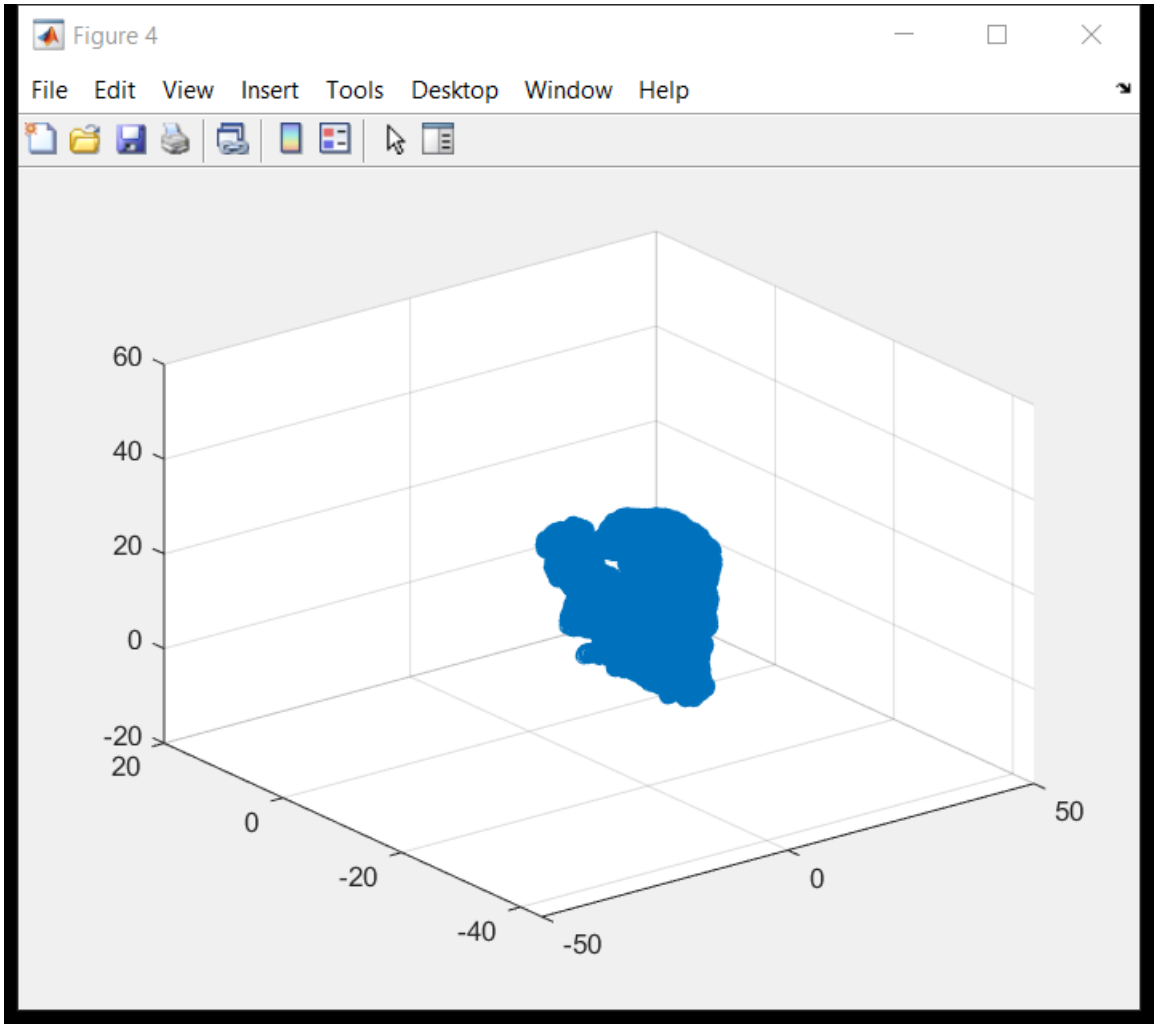


Figure 4
File Edit View Insert Tools Desktop Window Help
60
40
20
0
-20
20
0
-20
-40
-50
0
50