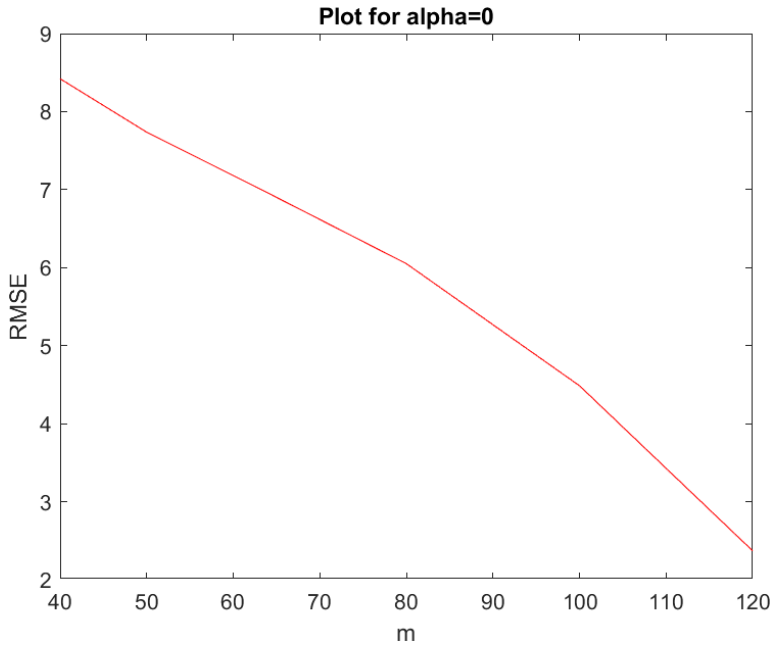
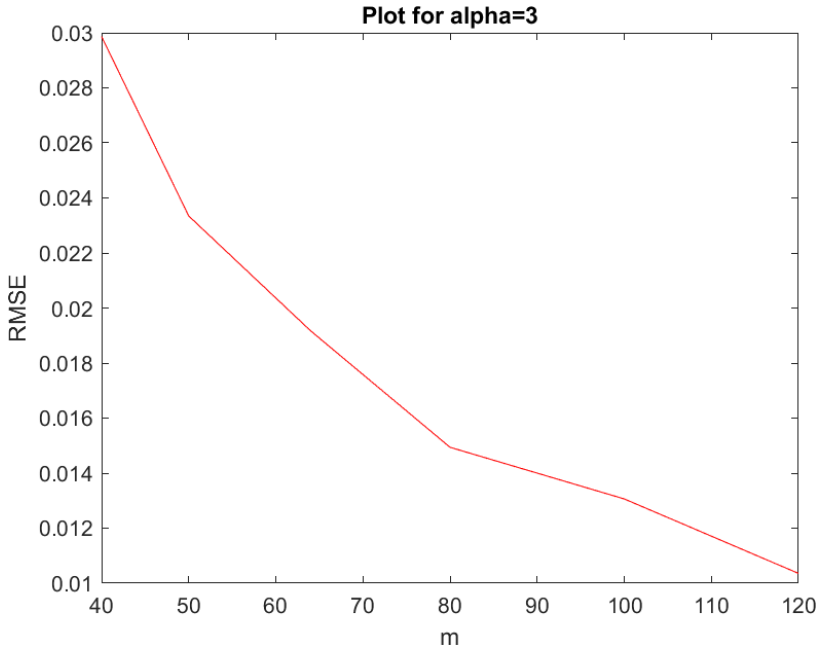
Q2 – Report


Plot for alpha=0
RMSE
m
9
8
7
6
5
4
3
2
40
50
60
70
80
90
100
110
120


Plot for alpha=3
RMSE
m
0.03
0.028
0.026
0.024
0.022
0.02
0.018
0.016
0.014
0.012
0.01
40
50
60
70
80
90
100
110
120

There is an exceptionally large difference when α is varied from $\alpha = 0$ to $\alpha = 3$ there is about a 200 – 300 times reduction in RMSE error when the value of α is changed from 0 to 3.

Here the signal is not sparse but the decay of eigenvalues with increasing α in the covariance matrix is equivalent to signal sparsity in the appropriate orthonormal basis which is here a matrix of i.i.d gaussian entries.