

Q1 Report

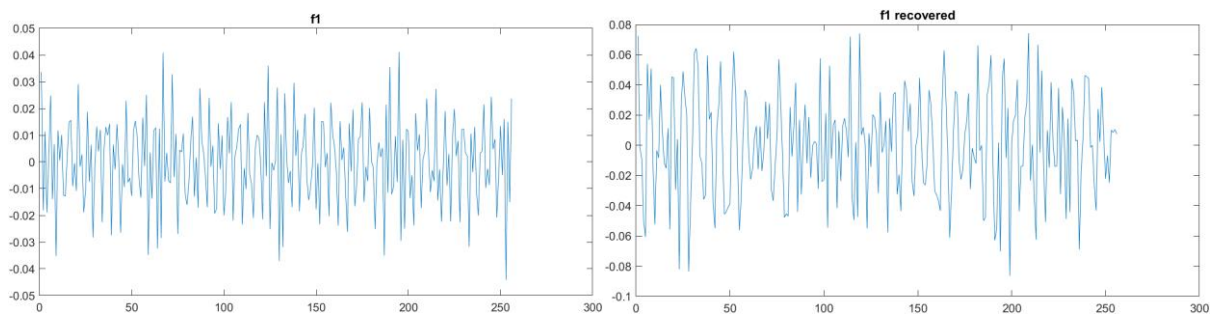
Solver Used: ISTA

Parameters used:

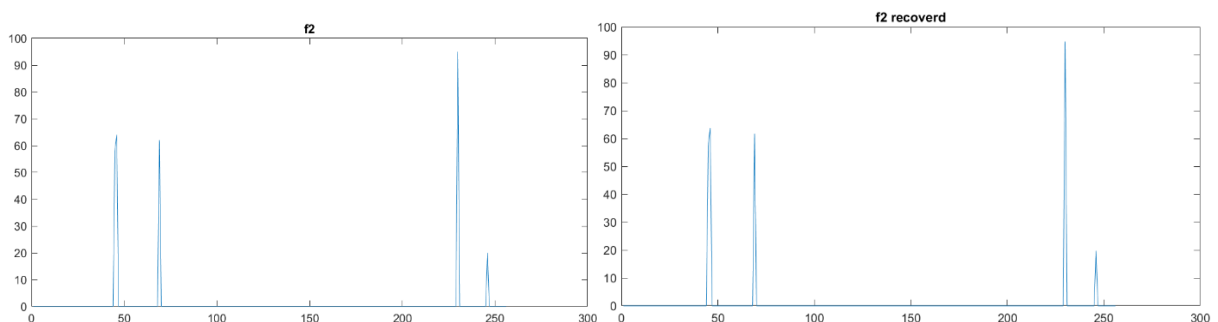
- Lambda = 0.6
- Epsilon = 10^{-15}

The parameter values were tuned manually for the case given below where $\sigma=0.01$ and $\text{sparsity}=5$ is used for the optimum error rate and the same is used for other cases.

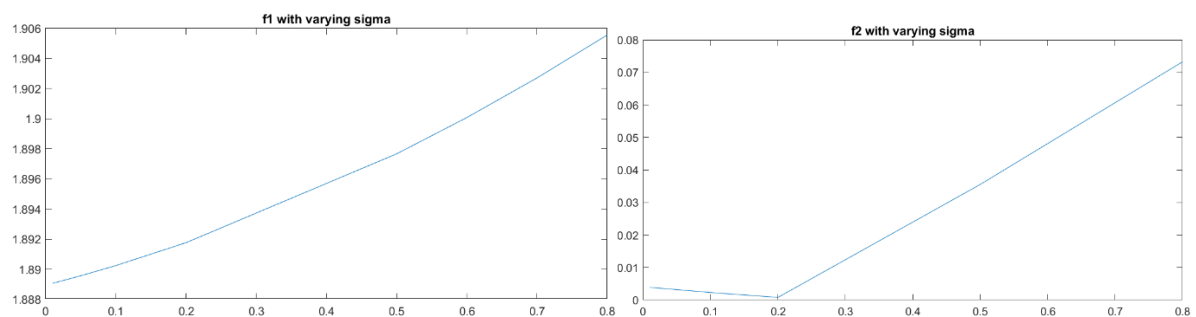
Original signal f1 and recovered signal f1:



Original signal f2 and recovered signal f2:

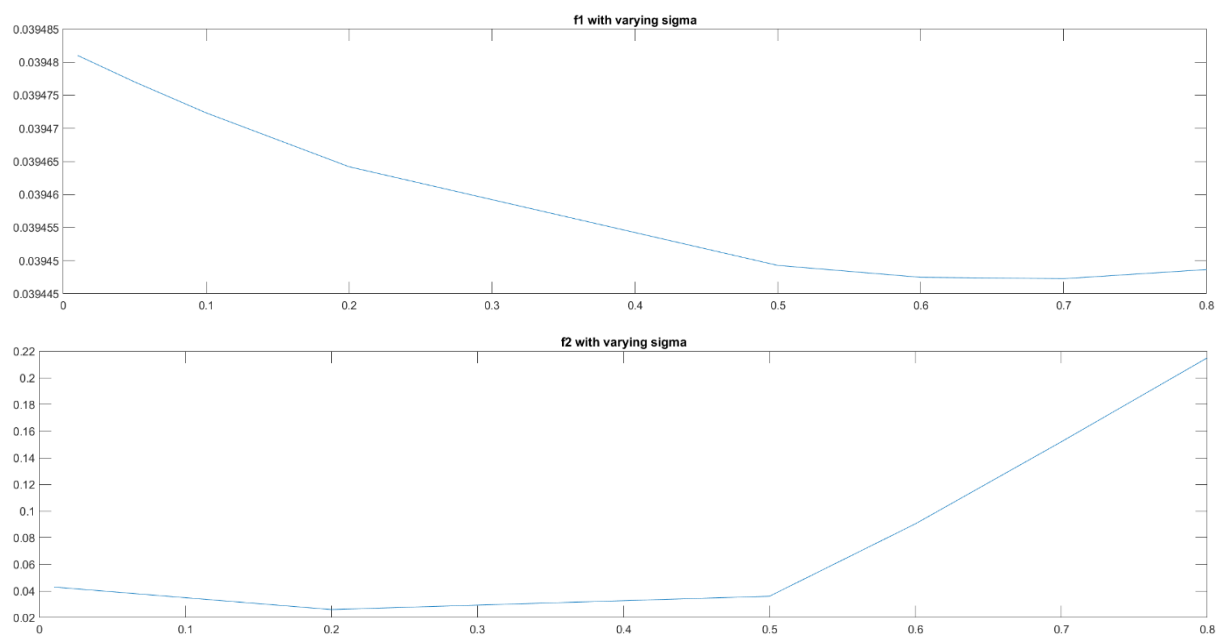


Relative Reconstruction error for f1 and f2 when varying sigma:



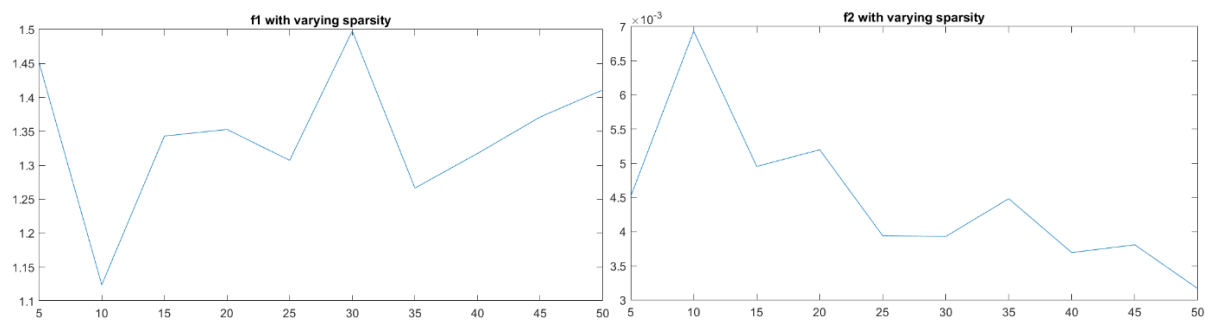
Here the error for f1 when plotted with respect to sigma comes out to be a linear relation as shown above. Whereas for f2 there is a slight dip in error at first till sigma=0.2 and then linearly increases.

RMSE for f1 and f2 when varying sigma:



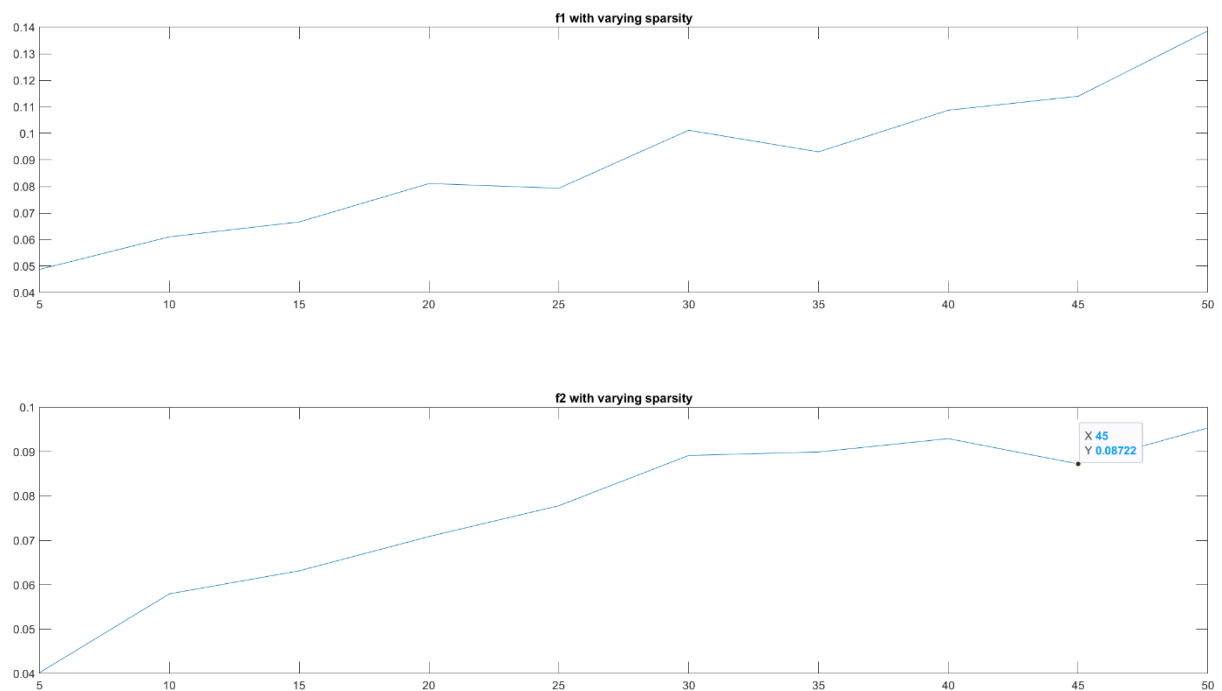
In RMSE error, the plot for f1 clearly shows decrease in error with increase in sigma. In plot for f2 the error remains almost constant till sigma=0.5 and then error increases linearly with respect to sigma as shown in the above plots.

Relative Reconstruction error for f1 and f2 when varying sparsity:



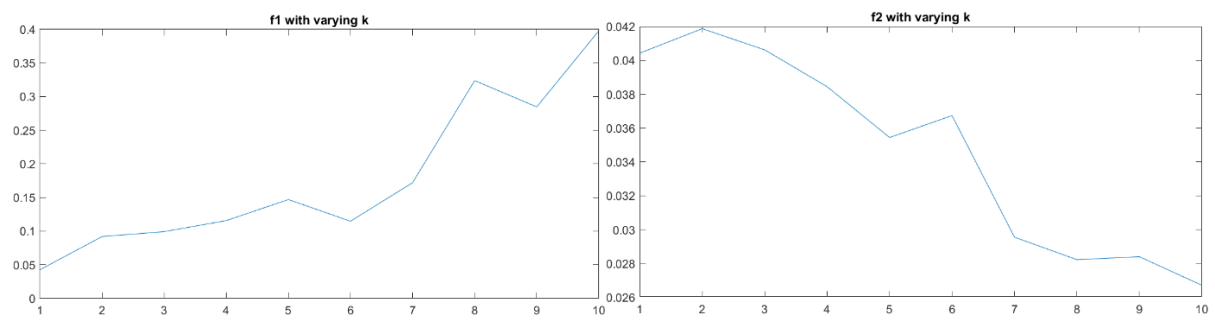
There does not seem to be a clear pattern for f1's relative reconstruction error. But f2 shows a pattern where error decreases with increase in sparsity.

RMSE for f1 and f2 when varying sparsity:



f1 shows an increase in error with increase in sparsity. Whereas in f2 error firstly increases and then the curve becomes flat after sparsity reaches 30.

RMSE for f1 and f2 when varying k:



Here for f1 we can see an overall increase in error whereas in case of f2 it decreases as shown above in the plots.