Ch3: Generalized inverse uncertainty, individual activity

1.

Singular values and $1/j^\alpha$ for α = 1,5,0.1,0.2

Legend:
- Sigular values
- O(1/j)
- O(1/j^5)
- O(1/j$^{0.1}$)
- O(1/j$^{0.2}$)
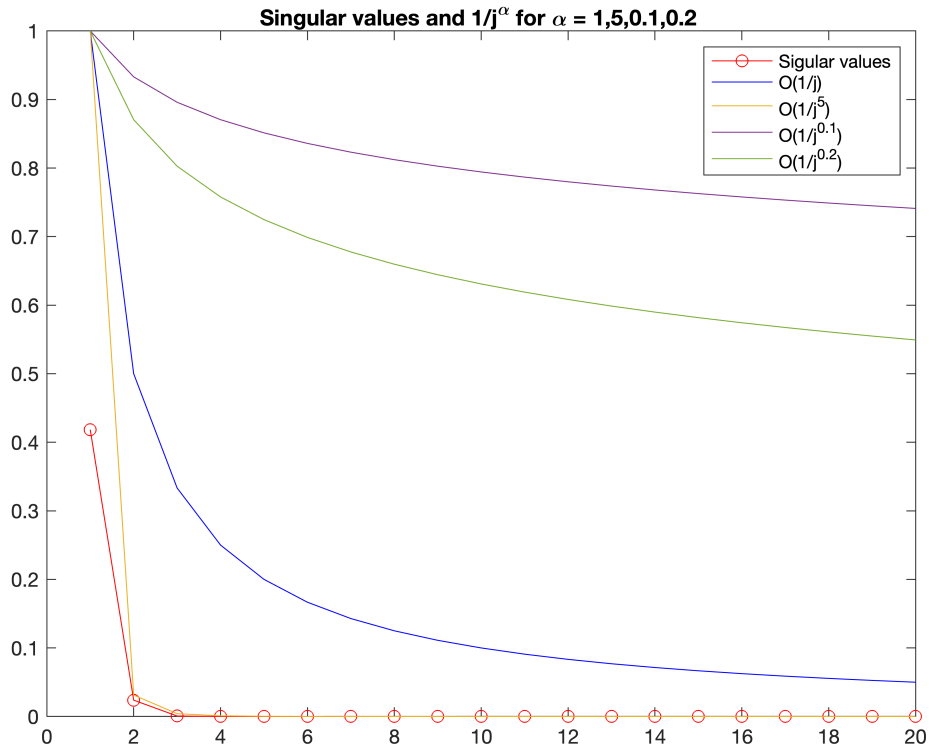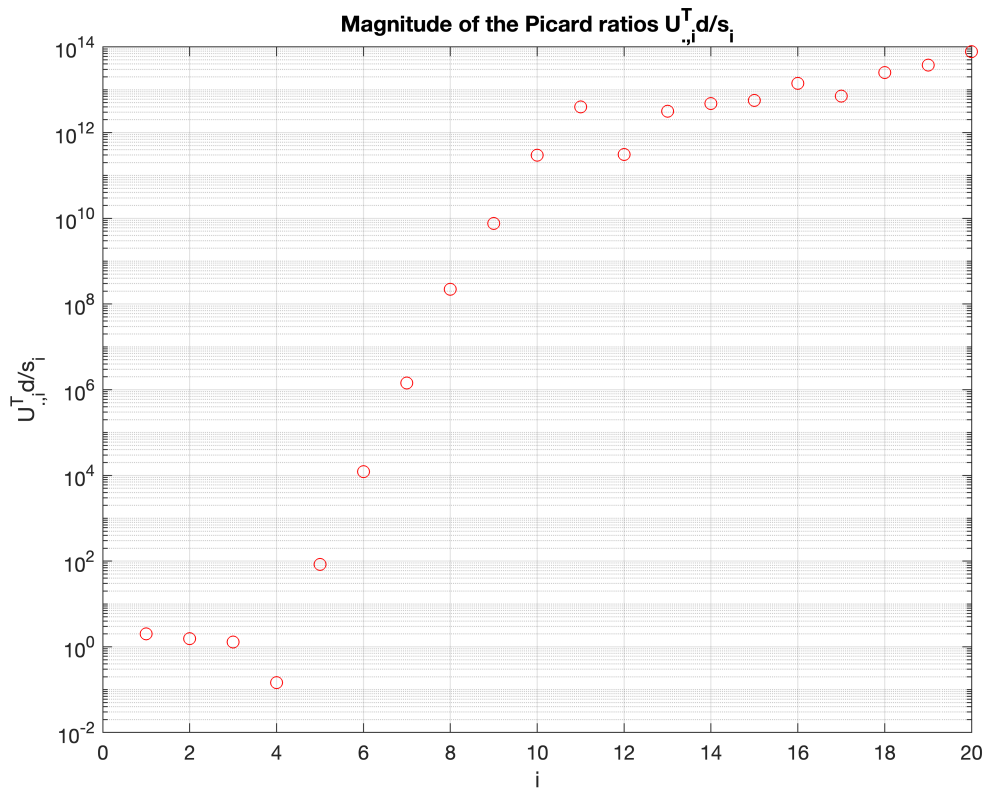
Since the singular values $s_i = O(j^{-\alpha})$ for $\alpha > 1$, then the problem is moderately ill-posed.

2.
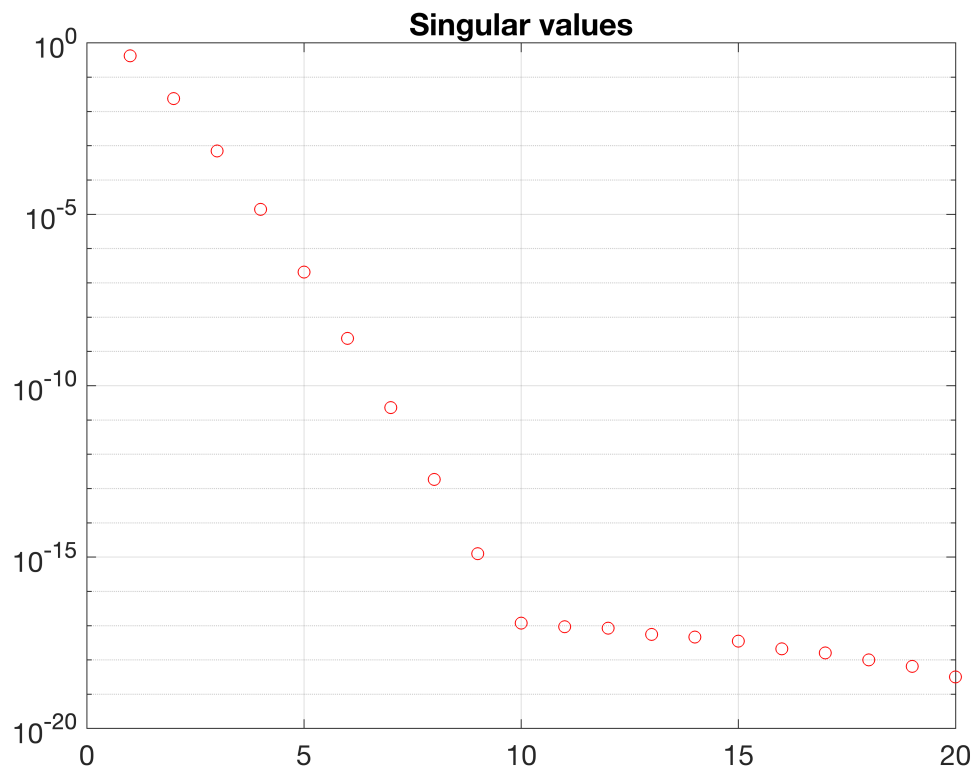
Singular values

The value for i above which the singular values can reasonably be considered to be nonzero and below which the singular values can be considered to be zero is **i=9**.


3.

Magnitude of the Picard ratios $U_{.,i}^T d / s_i$

The value for i where the coefficients abruptly increase is; **i=5** and this value is   less than that for i in 2 above.

4.

TSVD model parameter estimates for i=4
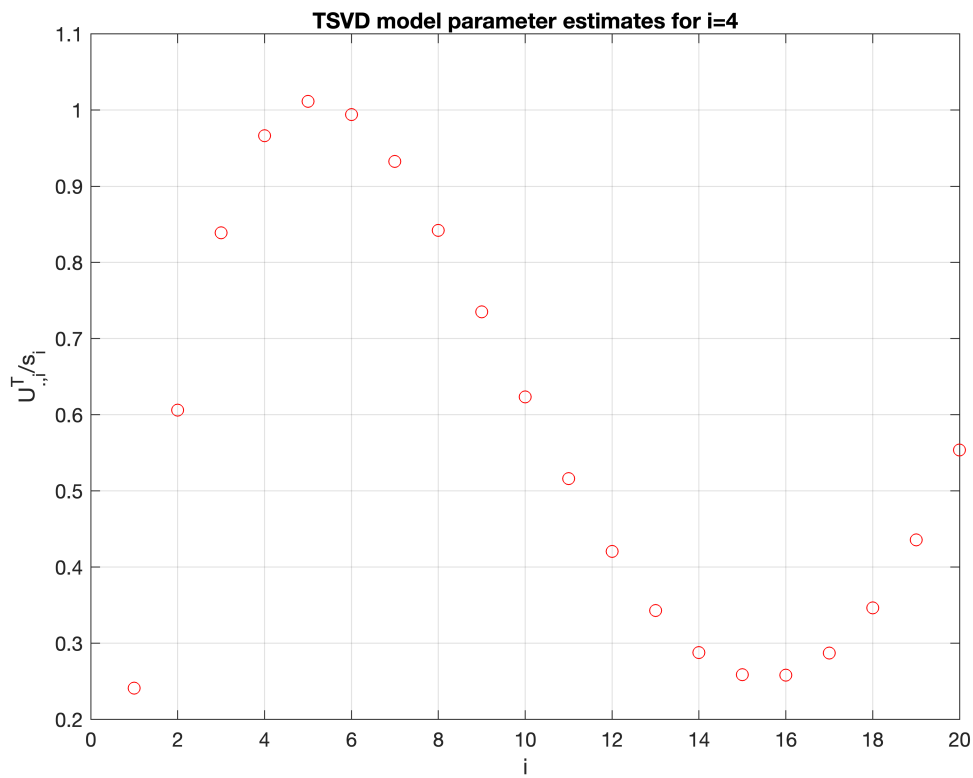
After trying for i=2,3,4 and 5, I identified i=4 as the largest possible i that give reasonable looking graph and this value of i is less than those you identified in 3 and 2 above.

5.

TSVD model parameter estimates
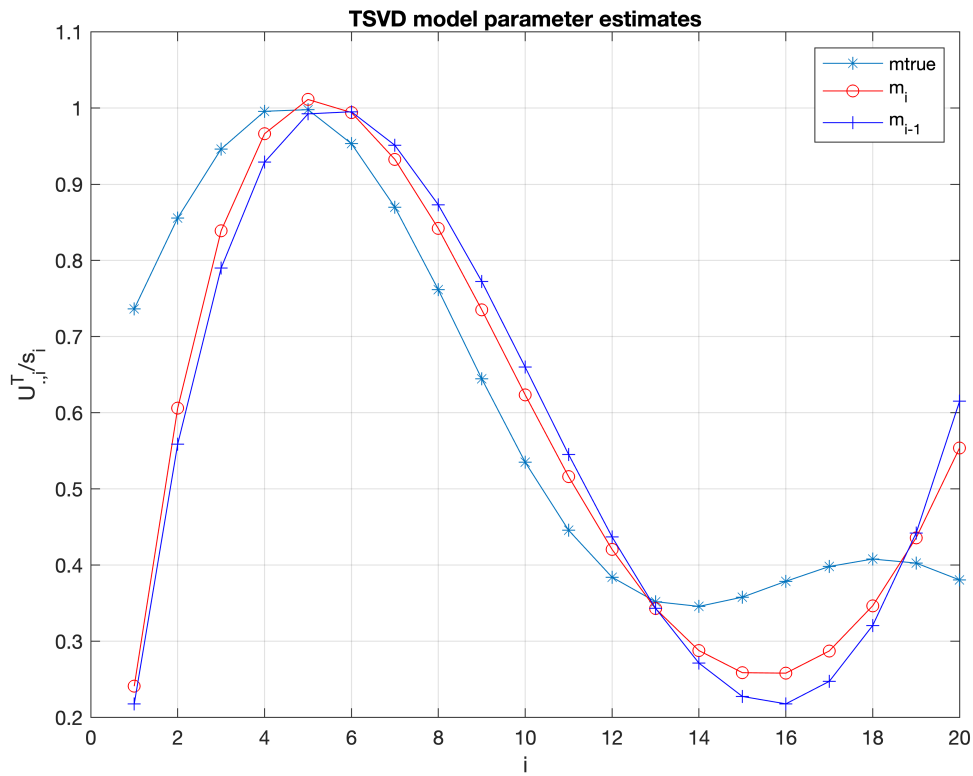
The TSVD model parameters vary from the true parameters i.e. they don't fit the true parameters at almost all i's except at i= 5 and at i=13 where the TSVD model parameters are very close to the true parameters. It is also observed that the TSVD model parameters for i-1 are further away from the true parameters than that of i. This means that the more we truncate, the more we deviate from the true parameters.