

Lab Sheet 6

Question 3

Part (a)

Largest main diagonal entry: 1.000000

Smallest main diagonal entry: 0.001904

Part (b)

Rank of A using MATLAB= 89

`sig(1) = 8.789335`

`sig(89) = 0.002384`

`sig(90) = 0.000000`

In format short e, `sig(90) = 3.960644e-15`

Part (c)

Rank of A using MATLAB= 89

`sig(1) = 8.789335`

`sig(89) = 0.002384`

`sig(90) = 0.000000`

In format short e, `sig(90) = 3.960653e-15`

`dif = 0.000000`

`R(90,90) = 0.001904`

Since $R(90,90) > 0$ clearly, QR decomposition with column pivoting failed to detect the numerical rank deficiency of A.

Since $\text{sig}(90) \sim 0$, SVD is more efficient when detecting numerical rank deficiency.