

Problem 5: Scaling a linear system

a) Please check problem5_a.py

relative residuals: $2.01239\text{e-}15$

relative error: $9.28687\text{e-}14$

cond(A): 2032.7

b) Please check problem5_b.py

relative residuals: 1

relative error: $9.28687\text{e-}14$

cond(DA): 2032.7

c) Please check problem5_c.py

relative residuals: 49.2039

relative error: $1.54848\text{e-}13$

cond(DA): 11523.4

d) Please check problem5_d.py

relative residuals: 4967.92

relative error: $8.31082\text{e-}14$

cond(DA): 633521

e) Please check problem5_e.py

relative residuals: $3.79728\text{e+}14$

relative error: $9.83454\text{e-}14$

cond(DA): $2.56716\text{e+}31$

The scaling of case in (c) gives the worst accuracy.

In this case, relative residuals is still small comparing to case (d) and (e) .

Condition number is positively correlated with relative residual but not necessarily correlated with relative error.