5) $Ax = b$

Condition number of $A = \|A\|_2 \, \|A^{-1}\|_2 = \frac{\text{max mag}(A)}{\text{min mag}(A)}$

For A to be orthogonal,

(i) Max mag (A) = Min mag (A) = 1 // For Orthogonal A

Condition number of A = 1,

Hence $\frac{\|\delta x\|}{\|x\|} \leq 1 . \frac{\|\delta b\|}{\|b\|}$

So the solution is stable w.r.t perturbations.

Also thus orthogonal matrices effectively do some rotation / reflection or combination of both and does not do any scaling

(ii) Benefits in Computation

for orthogonal A, $A^{-1} = A^T$

Hence $x = A^T b$ is a solution to the equation.

Thus inverse computation is very simple