

CSC338: Tutorial 4

1. Assume that

$$A = \begin{bmatrix} 4 & -2 & 1 \\ -2 & 5 & -2 \\ 1 & 4.75 & -4 \end{bmatrix} \quad b = \begin{bmatrix} 3 \\ -5 \\ 1 \end{bmatrix}$$

What are the values of $\|b\|_1$, $\|b\|_2$, $\|b\|_\infty$, $\|A\|_1$, and $\|A\|_\infty$?

2. Consider the matrix A from the previous question. Bob thinks that in the decomposition $PA = LU$ of the matrix A , that $P = I$, the identity function. That is, no row exchanges will be performed as part of partial pivoting. The reason he believes so is because in A , the largest element in each row and each column is already on the diagonal. Is Bob right? Why or why not?

3. Compute the $PA = LU$ factorization of the below matrix using pivoting.

$$A = \begin{bmatrix} 2 & 6 & 8 \\ 4 & 8 & 4 \\ 1 & 3 & 5 \end{bmatrix}$$