Quiz (5) MCS 471 Jan Verschelde Friday 23 September 2022

Submit your Jupyter notebook with the answers to gradescope by 10:50am.

Consider the linear system $A\mathbf{x} = \mathbf{b}$ with

$$A = \begin{bmatrix} 10^{-10} & 1 \\ 2 & 10^{-10} \end{bmatrix} \quad \text{and} \quad \mathbf{b} = \begin{bmatrix} 1 \\ 1 \end{bmatrix}.$$

1. Compute the LU factorization of A with the `lu` of the `LinearAlgebra` module and use the output of `lu` to compute $\mathbf{x}$.
2. Compute the LU factorization of A *without* pivoting and use the factors of this computation to solve the system.
3. Explain the difference between the two solutions, once obtained with and once without pivoting.