

FIT3139: Applied session for week 3

Question 1

Consider the function $f(x) = x^2$. Find its condition number and discuss its sensitivity. Repeat the exercise for the function $g(x) = \sin x$

Question 2

Provide the LU decomposition of:

$$A = \begin{pmatrix} 1 & 3 & -2 \\ 1 & 5 & 3 \\ 2 & 12 & 10 \end{pmatrix}$$

Question 3

Implement a function to compute the LU decomposition of any given square matrix A .

Question 4

Solve the following system of equations:

$$\begin{aligned} 0.0001x + y &= 1 \\ x + y &= 2 \end{aligned}$$

First solve this system using Gaussian Elimination or LU decomposition then solve it again using partial pivoting. In both cases, use a precision of 3 significant figures.

Question 5

Implement a function to compute the PLU decomposition of any given square matrix A using pivoting.