SECI1113/SCSI1113 (Programming Project)

Due date 2 July, 2020

Write a program to

1) Calculate determinant of matrix 2x2 and 3x3

Input example : $\begin{bmatrix} 3 & 1 \\ -2 & 2 \end{bmatrix}$ $\begin{bmatrix} 2 & 1 & -1 \\ 3 & 1 & 4 \\ 5 & -3 & 3 \end{bmatrix}$

Output : 8 **output: 55**

2) Solve linear system using LU factorization (either Do Little or Crout). The input of your program is a system linear equation (You can limit the number of variables and equations in the linear system but must >=3). Inform user the input limitation.

Input example

$$3x_1 + 6x_2 - 3x_3 = 3$$
$$6x_1 + 15x_2 - 5x_3 = 11$$
$$-x_1 - 2x_2 + 6x_3 = 9$$

output

$$x_1 = 1, x_2 = 1, x_3 = 2$$

3) Construct a quadratic polynomial equation for a set data point using least square technique (you can limit the data point up to 7). The data set is input by the user. Interpolate the $f(x_i)$ using the derived equation. (the x_i value also an input from the user)

Input example

Data point

x	1	3	4	*5*	8
y	5	9	11	13	19

x_i=4.5

Output

$p(x)=3.0 +2.0x+2x^2$

p(4.5)=52.5

Input screen suggestion

Menu

1) Determinant calculation
2) LU factorization
3) Interpolation
4) Exit

Input option :

You should control your program where if for example the size of matrix for determinant is greater than 3, program should ask user to enter the right input. The program only stop when the user input is 4 (exit)