Assignment 3. Marks 10

Posted on 27.08.2021 and due on 04.09.2021 midnight

Using Gauss-Jordan elimination, solve the following problems numerically. All the necessary functions will go in your own library (file) while the main code will simply read the input *i.e.* initialization, call relevant functions and write the solutions.

1. Use Gauss-Jordon elimination to find the solution of the following system of linear equations, **[2]**

$$\begin{aligned} x + y + z + w &= 13 \\ 2x + 3y - w &= -1 \\ -3x + 4y + z + 2w &= 10 \\ x + 2y - z + w &= 1 \end{aligned}$$

2. Use Gauss-Jordon elimination to find the solution of the following system of linear equations, **[3]**

$$\begin{aligned} 2y - 3z &= -1 \\ x + z &= 0 \\ x - y &= 3 \end{aligned}$$

3. Find the inverse of the following invertible matrix using Gauss-Jordon elimination. Keep only up to 2 places in decimal. Verify that your solution is indeed the inverse of the given matrix. **[3]**

$$\begin{pmatrix} 0 & 2 & 1 \\ 4 & 0 & 1 \\ -1 & 2 & 0 \end{pmatrix}$$

4. Use Gauss-Jordon elimination to determine the determinant of the matrix, **[2]**

$$\begin{pmatrix} 1 & 4 & 2 & 3 \\ 0 & 1 & 4 & 4 \\ -1 & 0 & 1 & 0 \\ 2 & 0 & 4 & 1 \end{pmatrix}$$