Practice Sheet

CSE330

Gaussian Elimination Method and LU decomposition

1. Use Gaussian elimination to solve the system of linear equations
   x1 + 5x2 = 7;−2x1 − 7x2 = −5
2. Use Gaussian elimination to solve the system of linear equations
   2x2 + x3 = −8 ; x1 − 2x2 − 3x3 = 0;−x1 + x2 + 2x3 = 3
3. Use Gaussian elimination to solve the system of linear equations
   x1 − 2x2 − 6x3 = 12; 2x1 + 4x2 + 12x3 = −17; x1 − 4x2 − 12x3 = 22.
4. Use Gaussian elimination to solve the system of linear equations
   x + y + z = 5 ; 2x + 3y + 5z = 8; 4x + 5z = 2
5. Use Gaussian elimination to solve the system of linear equations
   x + 2y − 3z = 2; 6x + 3y − 9z = 6; 7x + 14y − 21z = 13
6. Use Gaussian elimination to solve the system of linear equations
   4y + z = 2 ;2x + 6y − 2z = 3; 4x + 8y − 5z = 4
7. Use Gaussian elimination to solve the system of linear equations
   A + B + 2C = 1; 2A − B + D = −2; A − B − C − 2D = 4 ;2A − B + 2C − D = 0
8. Use Gaussian elimination to solve the system of linear equations
   x1 + 3x2 + 5x3 = 14; 2x1 − x2 − 3x3 = 3; 4x1 + 5x2 − x3 = 7
9. Use Gaussian elimination to solve the system of linear equations
   3x1 − 4x2 + 5x3 = −1; −3x1 + 2x2 + x3 = 1; 6x1 + 8x2 − x3 = 35
10. Use Gaussian elimination to solve the system of linear equations
    x1 + x2 + x3 = −1; 2x1 + 2x2 + 5x3 = −8; 4x1 + 6x2 + 8x3 = −14
11. Use LU decomposition method for the all the above systems.
12. Find inverse of the below matrix using LU decomposition
    1 0 2; 2 −1 3 ;4 1 8
13. Find inverse of the below matrix using LU decomposition
    2 5 4;3 2 1;6 4 1;
14. Find inverse of the below matrix using LU decomposition
    -7 7 9;1 4 3; 2 3 5;
15. Find inverse of the below matrix using LU decomposition

$$[A] = \begin{Bmatrix} 3 & -0.1 & -0.2 \\ 0.1 & 7 & -0.3 \\ 0.3 & -0.2 & 10 \end{Bmatrix}$$