Anna University, Chennai

B.E Computer Science and Engineering

IV Semester

MA6201 Linear Algebra

Assignment II

1. Solve the following system by LU decomposition method:
$$x + y + z = 3;\ 2x - y + 3z = 16; 3x + y - z = -3$$

2. Using Gauss Jordan Method solve:
$$10x - 2y + 3z = 23; 2x + 10y - 5z = -33; 3x - 4y + 10z = 41$$

3. Solve the following system by applying first two iterations Gauss Jacobi and continue using Gauss Seidel Method correct to 4 decimal places.
$$3x - y + z = 1; 3x + 6y + 2z = 0; 3x + 3y + 7z = 4$$

4. Solve by Gauss Elimination Method:
$$2x + 6y + 10z = 0;\ \ x + 3y + 3z = 2; 3x + 14y + 28z = -8.$$

5. Determine whether $V_2(R)$ is an inner product space or not with an inner product defined by $\langle x, y\rangle = x_1y_1 + x_2y_1 - x_1y_2 + 4x_2y_2$ where $x = (x_1, x_2)$ and $y = (y_1, y_2)$.

6. Let $V = P_2(R)$ be the set of all pollynomials of degree less than or equal to 2 with real coefficientrs and with the inner product $\langle f(x), g(x)\rangle = \int_0^1 f(t)g(t)dt$.Using Gram-Schmidt orthogonalization process construct an orthogonal basis from the given set $S = \{1, x, x^2\}$ of V.

7. Using Least Square approximation determine the best fit for the data: $\{(-3,9), (-2,6), (0,2), (1,1)\}$.

8. Obtain Cholesky Decomposition for matrix $A = \begin{pmatrix} 1 & 2 \\ 2 & 13 \end{pmatrix}$

9. Let $S = \{v_1, v_2, \ldots \ldots v_n\}$be an orthogonal set of non zero vextors in an inner product space V. Then prove that S is linearly independent.

10. The three vectors $v_1 = (1,2,1), v_2 = (2,1,-4), v_3 = (3,-2,1)$ are mutually orthogonal. Express the vectors $v = (7,1,9)$ as a linear combination of v_1, v_2, v_3.