Anna University, Chennai.

B.E Computer Science and Engineering

IV Semester

MA6201 Linear Algebra

Assessment II

Part A

(5x2=10 marks)

1. Using QR decomposition find Q for matrix $A = \begin{pmatrix} 1 & 1 \\ 1 & 0 \end{pmatrix}$.
2. Find Σ in $A = U\Sigma V^T$ by Singular Value Decomposition where $A = \begin{pmatrix} 3 & 2 & 2 \\ 2 & 3 & -2 \end{pmatrix}$.
3. Using Jacobi's method find the transpose of rotation matrix $A = \begin{pmatrix} 2 & 0 & -1 \\ 0 & 2 & 0 \\ -1 & 0 & 2 \end{pmatrix}$.
4. Examine Whether or not $\begin{pmatrix} \frac{1}{\sqrt{2}} & \frac{-1}{\sqrt{2}} \\ \frac{1}{\sqrt{2}} & \frac{1}{\sqrt{2}} \end{pmatrix}$.
5. Find the smallest Eigenvalue of matrix $A = \begin{pmatrix} 3 & 7 \\ 4 & 5 \end{pmatrix}$ using Inverse Power Method.

Part B

(5x6=30 marks)

6. Obtain by Power Method the numerically largest Eigen value and its corresponding Eigen vector for the matrix $A = \begin{pmatrix} 2 & 1 & 3 \\ 1 & 4 & 2 \\ 3 & 2 & 3 \end{pmatrix}$ starting with the vector $(1 \quad 0 \quad 0)^T$.
7. Using Jacobi Rotation method, find all the eigenvalues and corresponding eigenvector of matrix $A = \begin{pmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{pmatrix}$.
8. Compute Singular value decomposition of $A = \begin{pmatrix} 2 & 0 & 0 \\ 0 & 2 & 1 \\ 0 & 1 & 2 \\ 0 & 0 & 0 \end{pmatrix}$.
9. Solve $5x + 2y - z = 6; 2x + 6y - 3z = 5; x - 2y + 5z = 12$ by SOR method with $\omega = 1.25$.
10. Decompose $A = \begin{pmatrix} -4 & 4 & 2 \\ 4 & -4 & 1 \\ 2 & 1 & 0 \end{pmatrix}$ using QR decomposition.