Sardar Vallabhbhai Patel Institute of Technology, Vasad

B. E. First Sem (Mathematics 1)

Tutorial-4

Q:1 Find the inverse of the matrices using row operation if exist.

$$\begin{bmatrix} 1 & 6 & 4 \\ 2 & 4 & -1 \\ -1 & 2 & 5 \end{bmatrix} \qquad \begin{bmatrix} 2 & 6 & 6 \\ 2 & 7 & 6 \\ 2 & 7 & 7 \end{bmatrix}$$

Q:2 Find the Eigen values and Eigen vectors for the given matrices:

$$\begin{bmatrix} 6 & -4 & 2 \\ -2 & 5 & -1 \\ -4 & 6 & 0 \end{bmatrix} \qquad \begin{bmatrix} 0 & 0 & -2 \\ 1 & 2 & 1 \\ 1 & 0 & 3 \end{bmatrix} \qquad \begin{bmatrix} 2 & -2 & 3 \\ 1 & 1 & 1 \\ 1 & 3 & -1 \end{bmatrix}$$

Q:3 If $A = \begin{bmatrix} 1 & 2 & -3 \\ 0 & 2 & 3 \\ 0 & 0 & 2 \end{bmatrix}$ then find the eigen value of A^T and $5A$.

Q:4 Find the Eigen value of $5A^T$.Is A invertible?

$$\mathbf{A}=\begin{bmatrix} 1 & 3 & 4 \\ 0 & 0 & 5 \\ 0 & 0 & 9 \end{bmatrix}$$

Q:5 Find the matrix P that diagonalize $A = \begin{bmatrix} 1 & 0 \\ -1 & 2 \end{bmatrix}$ and hence find A^{10}.

Q:6 Find the matrix P that diagonalize A and determine $P^{-1}AP$, where $A = \begin{bmatrix} 2 & 0 & -2 \\ 0 & 3 & 0 \\ 0 & 0 & 3 \end{bmatrix}$

Q:7 Verify Cayley-Hamilton theorem for $A = \begin{bmatrix} 2 & 1 & 1 \\ 0 & 1 & 0 \\ 1 & 1 & 2 \end{bmatrix}$

Q:8 Using Cayley-Hamilton theorem find A^4 *and* A^{-1} ,if $A = \begin{bmatrix} 1 & 0 & 3 \\ 2 & 1 & 1 \\ 1 & -1 & 1 \end{bmatrix}$