



**DEPARTMENT OF MATHEMATICS**

② Diagonalize the matrix  $A = \begin{pmatrix} 2 & 0 & 4 \\ 0 & 6 & 0 \\ 4 & 0 & 2 \end{pmatrix}$  by means of an orthogonal transformation.

Soln:

$$\lambda = -2, 6, 6$$

$$X = \begin{pmatrix} 1 \\ 0 \\ -1 \end{pmatrix}, \begin{pmatrix} 1 \\ 0 \\ 1 \end{pmatrix}, \begin{pmatrix} 0 \\ 1 \\ 0 \end{pmatrix}$$

$$N^T A N = D = \begin{pmatrix} -2 & 0 & 0 \\ 0 & 6 & 0 \\ 0 & 0 & 6 \end{pmatrix}$$

③ Diagonalize the matrix  $A = \begin{pmatrix} 2 & 1 & -1 \\ 1 & 1 & -2 \\ -1 & -2 & 1 \end{pmatrix}$  by means of an orthogonal transformation.

Soln:

$$\lambda = -1, 1, 4$$

④ Reduce the matrix  $\begin{pmatrix} 2 & -1 & 1 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{pmatrix}$  to diagonal form.

Soln:

$$\lambda = 1, 1, 4$$