Unit II

ORTHOGONAL TRASFORMATION OF SYMMETRIC MATRIX OF A DIAGONAL FORM

The transformation $N^TAN = D$ is known as orthogonal transformation or reduction

where N is normalized matrix

D is diagonal matrix whos diagonal elements are eigen values of given matrix

Methods through diagonalized a symmetric matrix by orthogonal Transformation

Step 1:

Find the characteristic equation and eigenvalu. and eigen vector. of a matrix A.

Step 2:

Check orthogonal condition

$$x_1^T x_2 = 0 \quad , \quad x_2^T x_3 = 0 \quad , \quad x_3^T x_1 = 0$$

Step 3!

The normalized eigen vector of $x = \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix}$

then the normalized vector

$$N = \begin{bmatrix} \frac{x_1}{l(x_1)} \\ \frac{x_2}{l(x_2)} \\ \frac{x_3}{l(x_3)} \end{bmatrix}$$

Step 4: Find model matrix $M = [N_1, N_2 N_3]$

Step 5: Find $N^TAN = D$