Period : 2

Quadratic form (Q)

A homogeneous polynomial of degree 2 any number of variables is, called quadratic form.

NOTE :-

The matrix corresponding to the quadratic form is

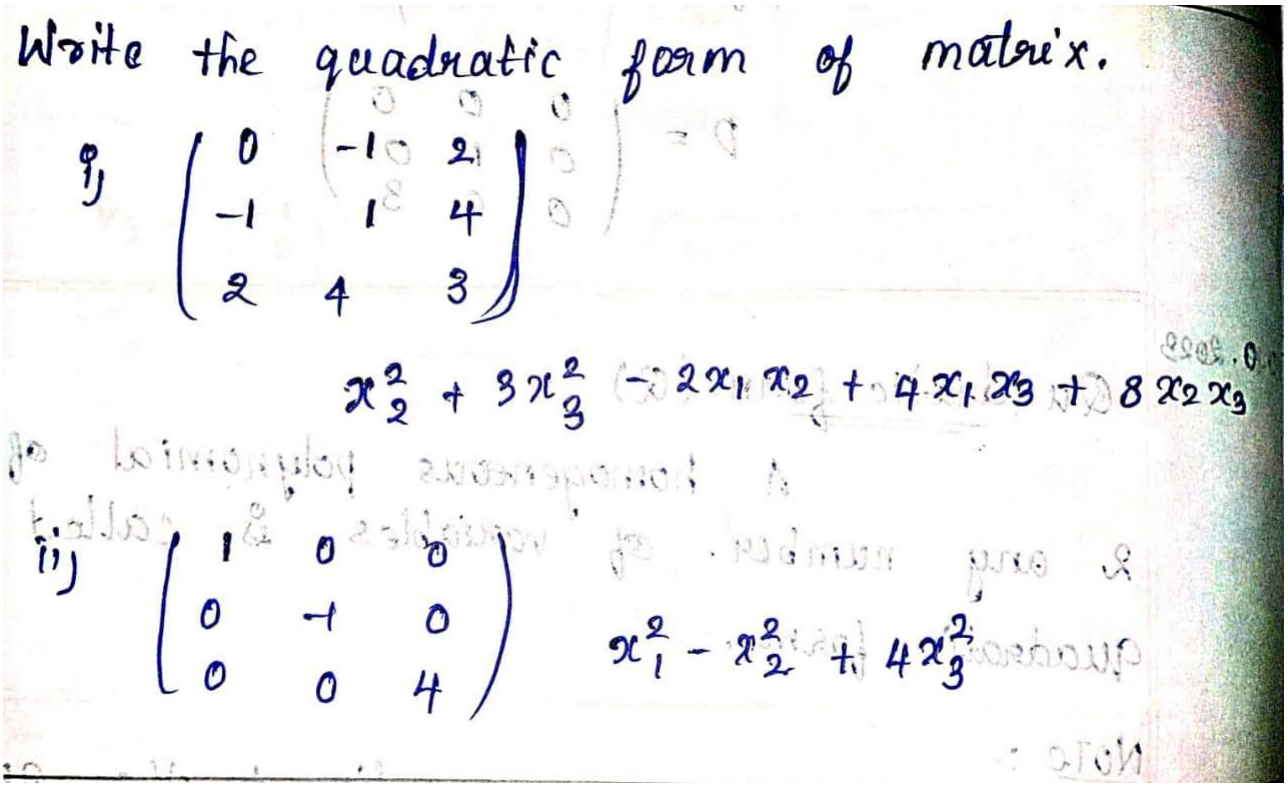
$$A = \begin{matrix} x_1 \\ x_2 \\ x_3 \end{matrix} \begin{pmatrix} \text{coefficient of } x_1^2 & \tfrac{1}{2}\text{coefficient of } x_1x_2 & \tfrac{1}{2}\text{coeff. of } x_1x_3 \\ \tfrac{1}{2}\text{coeff. of } x_2x_1 & \text{coeff of } x_2^2 & \tfrac{1}{2}\text{coeff of } x_2x_3 \\ \tfrac{1}{2}\text{coeff. of } x_3x_1 & \tfrac{1}{2}\text{coeff of } x_3x_2 & \text{coeff of } x_3^2 \end{pmatrix}$$

(same)

Write the matrix form of quadratic form

i) $2x_1^2 - 2x_2^2 + 4x_3^2 + 2x_1x_2 - 6x_1x_3 + 6x_2x_3$

ii) $2x^2 + 8z^2 + 4xy + 10xz - 2yz$



Write the quadratic form of matrix.

i) $\begin{pmatrix} 0 & -1 & 2 \\ -1 & 1 & 4 \\ 2 & 4 & 3 \end{pmatrix}$

$x_2^2 + 3x_3^2 - 2x_1x_2 + 4x_1x_3 + 8x_2x_3$

ii) $\begin{pmatrix} 1 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & 4 \end{pmatrix}$

$x_1^2 - x_2^2 + 4x_3^2$