MATRICES

This is the arrangement of objects or items in rows (horizontal) and columns (vertical)

TYPE OF MATRICES

1. Square

2. Diagonal

3. Scalar

4. Unit or Identity. It is usually represented with the letter I

5. Null

6. Column

7. Row

8. Upper triangle

9. Lower triangle

TRANSPOSE OF A MATRIX

Given a matrix A, the transpose of that matrix, represented as can be obtained by interchanging rows for columns and vice versa

SYMMETRIC MATRIX

A symmetric matrix is one which is the same as its transpose

MINOR

The minor of a matrix can be found by canceling out the row and column containing that element

The minor of a 3 by 3 matrix can also be found similarly. However, in this case, we have to deal with determinants. That is to say, we find the determinant after we have canceled out the row and column containing that element.

CO-FACTOR OF A MATRIX

The co-factor of a matrix can be found by

1. Finding the minor

2. Applying the sign conventions

For the sign convention, it is a minus raised to the position of the element (that is the row and column of the element)

For example, given a matrix A. When finding the cofactor the element will have a sign . That is . That will be a positive sign.

ADJOINT OF A MATRIX

This is the transpose of the co-factor of a matrix

INVERSE OF A MATRIX

Given a matrix A, the inverse of the matrix can be gotten from the formula:

Only a square matrix can have an inversely

A singular matrix is one that has a determinant of 0

A singular matrix has no inverse and its inverse is therefore undefined

If , then

APPLICATIONS OF MATRICES

Encoding

Decoding

Mathematics puzzles

Games

Information like credit card number

Optics

Economics

Cryptography: This also utilizes matrices, cryptography is science of information security.

THE ENCRYPTION PROCESS

First, text of the message into a stream of numerical rules and place the data into matrices and multiply the data by encoding matrices. At last, convert the matrices into a stream of numerical values that contain the encrypted message

For example, let A=1, B=2, C=3 and so on. Let a blank be represented by 0. Let us encode the message “I LOVE MY INDIA”.

We need to translate letters into numbers.

I LOVE MY INDIA

9,0,12,15,22,5,0,13,25,0,9,14,4,9,1

Now we decide on a coding matrix