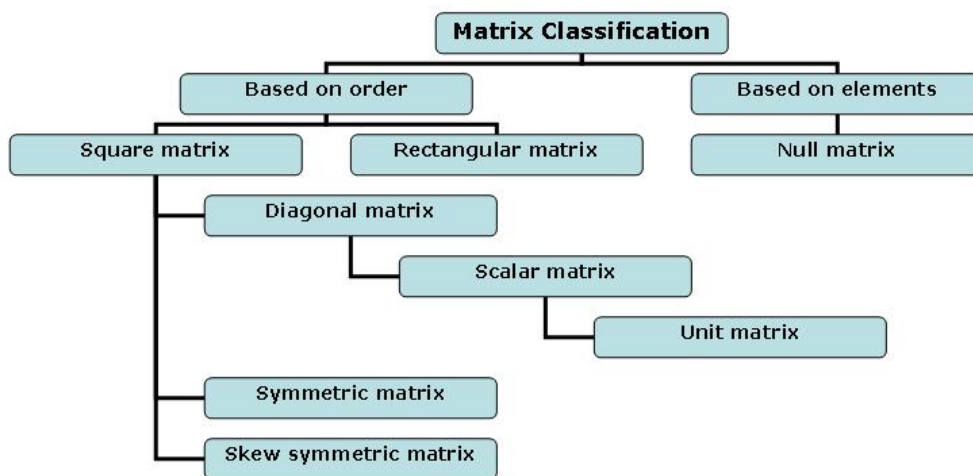


Biology

TYPES OF MATRICES

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Column Matrix



A matrix is said to be a [column matrix](#) if it has only one column. In general, $a = [a_{ij}]_{m \times 1}$ is a column matrix of order $m \times 1$

$$A = \begin{bmatrix} -2 \\ 3 \\ 4 \end{bmatrix} \quad B = \begin{bmatrix} 7 \\ -2/5 \\ 0 \\ -7 \end{bmatrix}$$

For example:

Order of A is 3×1 and that of B is 4×1

Row Matrix

A matrix is said to be a [row matrix](#) if it has only one row. In general, $B = [b_{ij}]_{1 \times n}$ is a row matrix of order $1 \times n$

For example: $A = [2 \ 0 \ 5 \ -3]$ $B = [1/2 \ 0 \ 3 \ 6 \ 7]$

Here order of A is 1×4 and that of B is 1×5

Square Matrix

A matrix whose numbers of columns are equal to number of rows is said to be a [square matrix](#). Thus an $m \times n$ matrix is said to be a square matrix if $m = n$ and is known as a square matrix of order 'n'.

$$A = \begin{bmatrix} 1 & 3 & -9 \\ -7 & 1 & -5 \\ 6 & 4 & 7 \end{bmatrix} \quad B = \begin{bmatrix} x & 1 \\ y & 1 \end{bmatrix}$$

For example:

Hence A is of order 3 and B is of order 2.

Diagonal Matrix

A square matrix $B = [b_{ij}]_{m \times m}$ is said to be a diagonal matrix if all its non [diagonal](#) elements are zero.

For example:

$$A = [6], B = \begin{pmatrix} -1 & 0 \\ 0 & -2 \end{pmatrix} C = \begin{pmatrix} -3 & 0 & 0 \\ 0 & 4 & 0 \\ 0 & 0 & 7 \end{pmatrix}$$

Hence the orders of A, B and C are 1, 2 and 3 respectively

Scalar Matrix

A diagonal matrix is said to be a [scalar matrix](#) if its diagonal elements are equal.

That is $b_{ij} = 0$, when $i \neq j$

$b_{ij} = k$, when $i = j$, for some constant k

For example:

$$A = [9] \quad B = \begin{pmatrix} 2 & 0 \\ 0 & 2 \end{pmatrix} C = \begin{pmatrix} \sqrt{5} & 0 & 0 \\ 0 & \sqrt{5} & 0 \\ 0 & 0 & \sqrt{5} \end{pmatrix}$$

Hence the order of A, B and C are 1, 2 and 3 respectively.

Identity Matrix

A square matrix in which elements in the diagonal are all 1 and rest all are zero is called an [identity matrix](#). In other words, the square matrix A =

$$[a_{ij}]_{n \times n} \text{ is an identity matrix, if } a_{ij} = \begin{cases} 1, & \text{if } i = j \\ 0, & \text{if } i \neq j \end{cases}$$

For example: $[1] \quad \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix} \quad \begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$ are identity matrices of order 1, 2 and 3 respectively.

Zero Matrix

A matrix is said to be a zero matrix if all its entries are zero. Another name for [zero matrix](#) is null matrix. It is denoted by 0.

For example:

$$[0] \begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix} \begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$$

The orders of the above matrices are 1 x 1, 2 x 2 and 2 x 3 respectively.

Now try it yourself! Should you still need any help, [click here](#) to schedule live online session with e Tutor!

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Reference Links:

- [http://simple.wikipedia.org/wiki/Matrix_\(mathematics\)#One_column_matrix](http://simple.wikipedia.org/wiki/Matrix_(mathematics)#One_column_matrix)
- http://en.wikipedia.org/wiki/Row_matrix
- <http://www.britannica.com/EBchecked/topic/561660/square-matrix>
- http://en.wikipedia.org/wiki/Diagonal_matrix
- http://en.wikipedia.org/wiki/Diagonal_matrix#Scalar_matrix
- http://en.wikipedia.org/wiki/Identity_matrix
- http://en.wikipedia.org/wiki/Zero_matrix

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