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Class: B.A. Economics (Part-3rd)
Paper: 07
Topic: Rank of Matrix
Date: 07-02-2024

Rank of Matrix

PINKY RANI   RANK OF MATRIX

- **Non-Singular and Singular Matrix** — The Square matrix A is called a Singular matrix if the corresponding determinant $|A| = 0$

The Square Matrix is called a non-Singular Matrix If corresponding $|A| \neq 0$

- **Rank of Matrix** — The Rank of Matrix A denoted by $P(A)$ is equal to the order of the highest order non-Singular square matrix contained in A.

Q. Find of Rank

$$A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}_{2 \times 2}$$

$$|A| = \begin{vmatrix} 1 & 2 \\ 3 & 4 \end{vmatrix}$$

$$|A| = 4 \times 1 - 3 \times 2 = 4 - 6 = -2$$

$$|A| = -2$$

$|A| \neq 0$

∴ Rank of Matrix is 2

Q. Rank of Matrix = ?

$$A = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix}_{3 \times 3}$$

$$|A| = 1\begin{vmatrix} 5 & 6 \\ 8 & 9 \end{vmatrix} - 2\begin{vmatrix} 4 & 6 \\ 7 & 9 \end{vmatrix} + 3\begin{vmatrix} 4 & 5 \\ 7 & 8 \end{vmatrix}$$

$$|A| = 1(5 \times 9 - 6 \times 8) - 2(4 \times 9 - 6 \times 7) + 3(4 \times 8 - 7 \times 5)$$

$$|A| = 1(45 - 48) - 2(36 - 42) + 3(32 - 35)$$

$$|A| = 1(-3) - 2(-6) + 3(-3)$$

$$|A| = -3 + 12 - 9$$

$$|A| = 0$$

So, We taking minor of A

$$A_{11} = \begin{bmatrix} 5 & 6 \\ 8 & 9 \end{bmatrix}_{2 \times 2}$$

$$|A_{11}| = 5 \times 9 - 6 \times 8$$

$$|A_{11}| = 45 - 48$$

$$|A_{11}| = -3$$

$$|A_{11}| \neq 0$$

So, Rank of Matrix is 2