

MATRIC NUMBER= 18/SCI01/068

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1)

i) **SINGULAR MATRIX**

A singular matrix is a matrix that is not invertible i.e the determinant is equal to zero

PROPERTIES

The matrices are known to be singular if their determinat is equal to zero

A singular matrix is not convertible in nature

ii) **NON-SINGULAR MATRIX**

A matrix is said to be non-singular if the determinant of the matrix is not equal to zero

PROPERTIES

If A and B are non-singular matrices of the same orderm then AB is non-singular

If A is non-singular, then Ak is non-singular for any positive integer k.

2)

Example 1: Determine whether the given matrix is a singular matrix

or not
$$\begin{bmatrix} 2 & 4 & 6 \\ 2 & 0 & 2 \\ 6 & 8 & 14 \end{bmatrix}$$

SOLUTION

The determinant is given by:

$$2(0-16)-4(28-12)+6(16-0) = -2(16)+2(16)=0$$

As the determinant is equal to 0, hence it is a singular matrix

Example 2: Determine whether the given matrix is a singular matrix

or not $\begin{bmatrix} 1 & 1 & 1 \\ 0 & 1 & 0 \\ 1 & 0 & 1 \end{bmatrix}$

SOLUTION

The determinant is given by:

$$1(1-0)-1(0-0)+1(0-1)=1-1=0$$

As the determinant is equal to 0, hence it is a singular matrix

Example 3: Determine whether the given matrix is a singular matrix

or not $\begin{bmatrix} 1 & -2 \\ -3 & 6 \end{bmatrix}$

SOLUTION

The determinant is given by:

$$6-6=0$$

As the determinant is equal to 0, hence it is a singular matrix

Example 4: Determine whether the given matrix is a singular matrix

or not $\begin{bmatrix} 2 & 4 & 6 \\ 2 & 3 & 2 \\ 6 & 8 & 4 \end{bmatrix}$

$$2 \ 3 \ 2$$

$$6 \ 8 \ 4$$

SOLUTION

The determinant is given by:

$$2(12-16)-4(8-12)+6(16-18) = -8+16+12 = 20 \neq 0$$

As the determinant is not equal to 0, hence it is a non-singular matrix

Example 5: Determine whether the given matrix is a singular matrix

or not

$$\begin{matrix} 3 & 2 & 1 \\ 5 & 0 & 4 \end{matrix}$$

$$\begin{matrix} 6 & 8 & 1 \end{matrix}$$

SOLUTION

The determinant is given by:

$$3(0-32)-2(5-24)+1(40-0) = -96+38+40 = -18 \neq 0$$

As the determinant is not equal to 0, hence it is a non-singular matrix