**Nwabueze precious akunna**

**18/sci01/055**

**Mat 204**

**QUESTION**

**1) summarize what you understand by singular and non- singular matrix**

**Solution**

**NON SINGULAR :**

**If the determinant of a matrix is not equal to zero, then the [matrix](basic-of-matrix.html" \o "basic of matrix) is called a non-singular matrix.**

**Properties of non-singular matrix:**

1. **If A and B are non-singular matrices of the same order, then AB is non-singular.**
2. **If A is non-singular, then Ak is non-singular for any positive integer k.**
3. **If A is non-singular and k is a non-zero scalar, then kA is non-singular.**

**SINGULAR :**

**The [matrices](https://mathinstructor.net/2012/02/starting-with-matrices-order-of-matrix/" \o "matrix" \t "_blank) are said to be singular if their [determinant](https://mathinstructor.net/2012/03/determinant-of-matrix/" \o "determinant of matrix" \t "_blank) is equal to zero. For example, if we have matrix A whose all elements in the first column are zero. Then, by one of the [property](https://mathinstructor.net/2012/03/properties-of-determinants/" \o "Properties of Determinants" \t "_blank) of determinants, we can say that its determinant is equal to zero. Hence, A would be called as singular matrix.**

**Note that singular matrices are non-invertible (their inverse does not exist).**

**QUESTION 2**

**Give 5 examples to back your explanations in example 1**

***Example:***

**IMG_256**

***Solution:***

**Determinant = (3 × 2) – (6 × 1) = 0**

**The given matrix does not have an inverse. It is a singular matrix.l**

**The determinant of IMG_256 i.e. IMG_257= 6(3) – 5(2) = 18 - 10 = 8 ≠ 0, so it is a non-singular matrix.**

**Example: Determine whether the given matrix is a Singular matrix or not**

**⎡⎣⎢⎢2264086214⎤⎦⎥⎥.**

**Solution: Given ⎡⎣⎢⎢2264086214⎤⎦⎥⎥**

**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.**

**is Singular Matrix ?  
[111111111]  
  
Solution:**

**A square matrix *A*, such that |*A*|=0, is called a singular matrix.**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***A*** | **=** | |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | **1** | **1** | **1** |  | |  | **1** | **1** | **1** |  | |  | **1** | **1** | **1** |  | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **|*A*|** | **=** | |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | **1** | **1** | **1** |  | |  | **1** | **1** | **1** |  | |  | **1** | **1** | **1** |  | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **=** | |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  | **1** |  | **×** |  | |  |  |  |  | | --- | --- | --- | --- | |  | **1** | **1** |  | |  | **1** | **1** |  | | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  | **-1** |  | **×** |  | |  |  |  |  | | --- | --- | --- | --- | |  | **1** | **1** |  | |  | **1** | **1** |  | | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  | **+1** |  | **×** |  | |  |  |  |  | | --- | --- | --- | --- | |  | **1** | **1** |  | |  | **1** | **1** |  | | |

**=1×(1×1-1×1)-1×(1×1-1×1)+1×(1×1-1×1)  
  
=1×(1-1)-1×(1-1)+1×(1-1)  
  
=1×(0)-1×(0)+1×(0)  
  
=0+0+0  
  
=0  
  
  
Here, |*A*|=0, so *A* is a singular matrix**

**2. is Singular Matrix ?  
[211121111]  
  
Solution:**

**A square matrix *A*, such that |*A*|=0, is called a singular matrix.**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***A*** | **=** | |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | **2** | **1** | **1** |  | |  | **1** | **2** | **1** |  | |  | **1** | **1** | **1** |  | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **|*A*|** | **=** | |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | **2** | **1** | **1** |  | |  | **1** | **2** | **1** |  | |  | **1** | **1** | **1** |  | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **=** | |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  | **2** |  | **×** |  | |  |  |  |  | | --- | --- | --- | --- | |  | **2** | **1** |  | |  | **1** | **1** |  | | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  | **-1** |  | **×** |  | |  |  |  |  | | --- | --- | --- | --- | |  | **1** | **1** |  | |  | **1** | **1** |  | | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  | **+1** |  | **×** |  | |  |  |  |  | | --- | --- | --- | --- | |  | **1** | **2** |  | |  | **1** | **1** |  | | |

**=2×(2×1-1×1)-1×(1×1-1×1)+1×(1×1-2×1)  
  
=2×(2-1)-1×(1-1)+1×(1-2)  
  
=2×(1)-1×(0)+1×(-1)  
  
=2+0-1  
  
=1  
  
  
Here, |*A*|≠0, so *A* is nonsingular matrix**

**窗体顶端**

**窗体底端**