**OKEREKE CHUKWUEMIKA EBUBECHUKWU**

**18/SCI01/066**

Let Matrix A= 2 0 1 B = 0 0 1 C = 3 0 1

 0 1 1 1 0 0 2 2 2

 1 0 0 0 0 2 1 3 0

1. **FIND THE LINEAR TRANSFORMATION OF A IF VECTOR X= (a, b, c)**

 A= 2 0 1 X= a

 0 1 1 b

 1 0 0 c

 T(x)= a 2 + b 0 + c 1

 0 1 1

 1 0 0

 T(x)= 2a+0+c

 0+b+c

 A+0+0

**Hence the transformation of a 2a+0+c**

 **b gives 0+b+c**

 **c a+0+0**

**2. FIND THE RANK OF B + C TRANSPOSE**

B = 0 0 1 3 0 1

 1 0 0 + 2 2 2

 0 0 2 1 3 0

B + C = 3 0 2

 3 2 2

 1 3 2

(B + C) T = 3 3 1

 0 2 3

 2 2 2

* TO FIND THE RANK OF (B + C) T

| (B + C) T) | = 3 2 3 3 0 3 1 0 2

 2 2 - 2 2 + 2 2

= 3(4-6) - 3(0-6) + 1(0-4)

= 3(-2) - 3(-6) + 1(-4)

= -6 + 18 - 4 = 8

8 ≠ 0

**HENCE THE RANK OF (B + C)T IS 3**

**3) CHECK WHETHER A, B AND C ARE SINGULAR OR SINGULAR MATRICES**

 **2** 0 1

A = 0 1 1

 1 0 0

 0 0 1

B = 1 0 0

 0 0 2

 3 0 1

C = 2 2 2

 1 3 0

**FOR B**

 **|A|=** 2 0 1

 0 1 1

 1 0 0

|A|= 2 1 1 - 0 0 1 + 1 0 1

1. 0 1 0 1 0

|A| = 2(0 - 0) - 0(0 -1) + 1(0-1)

|A| =2(0) – 0(-1) + 1(-1)

|A| = -1

 Therefore |A| = -1

 -1 ≠ 0

 **This means that it is a non-singular matrix**

**FOR B**

 |B| = 0 0 1

 1 0 0

 0 0 2

|B| = 0 0 0 - 0 1 0 + 1 1 0

 0 2 0 2 0 0

|B| = 0( 0 - 0) - 0( 2 - 0) + 1( 0 - 0)

|B| = 0(0) - 0(2) + 1(0)

|B| = 0 - 0 + 0 = 0

0 = 0

**This means that |B| is a singular matrix**

**FOR C**

|C| = 3 0 1

 2 2 2

 1 3 0

 |C| = 3 2 2 - 0 2 2 + 1 2 2

 3 0 1 0 1 3

= 3( 0 - 6) - 0( 0 - 2) + 1( 6 - 2)

 = 3( -6 ) - 0( -2 ) +1( 4 )

 = -18 + 4

-14≠0

 **Therefore, C is a non-singular matrix**