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18/SCIO1/021

MAT 204 ASSIGNMENT

Let A = 3 1 2 B = 1 0 2

1 0 2 2 0 1

2 1 1 1 1 3

C = 2 1 3

2 2 4

0 1 1

1. Linear transformation of A if vector X = (a, b, c )

solution

A = 3 1 2 , X = a

1 0 2 b

2 1 1 c

T(x) = a 3 + b 1 + c 2

1 0 2

2 1 1

T(x) = 3a + b + 2c

a 0 2c

2a b c

T(x) = 3a + b + 2c

a + 0 + 2c

2a + b + c

Hence the transformation of

a gives 3a + b + 2c

b a + 0 + 2c

c 2a + b + c

1. Find the rank of (B+C) transpose

B+C = 1 0 2 + 2 1 3

2 0 1 2 2 4

1 1 3 0 1 1

B+C = 3 1 5

4 2 5

1 2 4

(B+C)ᵀ = 3 4 1

1 2 2

5 5 4

To find rank

|(B+C)ᵀ | = 3 2 2 - 4 1 2 + 1 1 2

5 4 5 4 5 5

= 3(8 - 10) – 4(4 - 10) + 1(5 - 10)

= 3(-2) – 4(-6) + 1(5 – 10)

= -6 + 24 - 6

= 12

12 ≠ 0

Hence the Rank of (B+C)ᵀ is 3.

1. Check whether A, B, and C are singular or non-singular matrix.

For A;

|A|= 3 1 2

1 0 2

2 1 1

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

1 1 2 1 2 1

= 3(0 – 2) – 1(1 – 4) + 2(1 – 0)

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

= -6 + 3 + 2 = -1

-1 ≠ 0

؞It is a non-singular matrices.

For B;

|B| = 1 0 2

2 0 1

1 1 3

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

1 3 1 3 1 1

|B| = 1(0 – 1) – 0 + 2(2 – 0)

=1(-1) – 0 + 2(2)

= -1 – 0 + 4

=3

3 ≠ 0

؞It is a non-singular matrices.

For C;

|C| = 2 1 3

2 2 4

0 1 1

|C| = 2 2 4 - 1 2 4 + 3 2 2

1 1 0 1 0 1

|C| = 2(2 – 4) – 1(2 – 0) + 3(2 – 0)

=2(-2) – 1(2) + 3(2)

= -4 – 2 + 6

=0

؞It is a singular matrix.