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18/SCIO1/098

MAT 204 ASSIGNMENT

Let A = 2 1 4 B = 3 0 1

0 1 0 0 2 1

1 1 1 2 1 1

C = 1 1 1

2 3 0

1 2 1

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

solution

A = 2 1 4 , X = a

0 1 0 b

1 1 1 c

T(x) = a 2 + b 1 + c 4

0 1 0

1 1 1

T(x) = 2a + b + 4c

0 b 0

a b c

T(x) = 2a + b + 4c

0 + b + 0

a + b + c

Hence the transformation of

a gives 2a + b + 4c

b 0 + b + 0

c a + b + c

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

B+C = 3 0 1 + 1 1 1

0 2 1 2 3 0

2 1 1 1 2 1

B+C = 4 1 2

2 5 1

3 3 2

(B+C)ᵀ = 4 2 3

1 5 3

2 1 2

To find rank

|(B+C)ᵀ | = 4 5 3 - 2 1 3 + 3 1 5

1 2 2 2 2 1

= 4(10-3) – 2(2 - 6) + 3(1 - 7)

= 70 + 8 - 18

= 60

60 ≠ 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|= 2 1 4

0 1 0

1 1 1

|A| = 2 1 0 - 1 0 0 + 4 0 1

1 1 1 1 1 1

= 2(1 – 0) – 1(0 -0) + 4(0 - 1)

= 2-0-4 = -2

-2 ≠ 0

؞It is a non-singular matrices.

For B;

|B| = 3 0 1

0 2 1

2 1 1

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

1 1 2 1 2 1

|B| = 3(2 – 1) – 0 + 1(0 – 4)

= 3 – 0 -4

=-1

-1 ≠ 0

؞It is a non-singular matrices.

For C;

|C| = 1 1 1

2 3 0

1 2 1

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

2 1 1 1 1 2

|C| = 1(3 – 0) – 1(2 – 0) + 1(4 – 3)

= 3 – 2 + 1

= 1

؞

It is a non-singular matrices.