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18/sci01/078

Math 204 assignment

Instruction:

Define THREE matrices A, B and C

(1). Find the linear transformation of A if vector x=(a, b, c)

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

(3). check whether A, B and C are singular or non singular

Solution

A= 4 3 1 B= 1 2 8 C= 4 1 2

2 4 5 4 7 6 1 7 3

7 6 3 9 5 3 5 8 1

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

4 3 1 X= a

2 4 5 b

7 6 3 c

T(x) = a 4 b 3 c 1

2 + 4 + 5

7 6 3

T(x)= 4a 3b c

2a + 4b + 5c

7a 6b 3c

T(x)= 4a + 3b + c

2a + 4b + 5c

7a + 6b+ 3c

Hence the transformation of a 4a + 3b+ c

b gives 2a + 4b + 5c

c 7a+ 6b + 3c

1. B+C = 1 2 8 4 1 2

4 7 6 + 1 7 3

9 5 3 5 8 1

5 3 10

5 14 9

14 13 4

(B+C) T = 5 5 14

3 14 13

10 9 4

To find rank, find the determinant:

5(56-117)- 5(12-130)+ 14(27-140)

5(-61)-5(-118) +14(-113)

-305+ 590-1582

=-1297

-1297≠0

Hence the rank is 3

3)For A= 4 3 1

2 4 5

7 6 3

4(12-30)-3(6-35)+1(12-28)

4(-18)-3(-29) +1(-16)

-72+87-16

=-1

-1≠0

Hence it is a non-singular matrix.

For B= 1 2 8

4 7 6

9 5 3

1(21-30) -2(12-54)+8(20-63)

-9-2(-42)+8(-43)

-9+84-344

=-269

-269≠0. It is a non-singular matrix.

For C= 4 1 2

1 7 3

5 8 1

4(7-24)-1(1-15)+2(8-35)

-68+14-54=-108

This is a non-singular matrix.