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18/SCI01/075

COMPUTER SCIENCE

MAT 204

QUESTION 1

i). Linear dependence of vectors occurs when the scalars in a linear combination are not all equal to zero.

i.e α1u1+α2u2+ α3u3+…+ αnun=0 ii). Linear combination of vectors is a mathematical method of combining vectors using addition and scalar multiplication.

i.e α1v1+α2v2+ α3v3+…+ αmum

QUESTION 2

Uα+Vβ+Wγ= (a,b,c)

1 2 1 a

0 α + 1 β + 1 γ = b

-1 3 -4 c

α + 2β + γ = a ……..(i) β + γ = b ……..(ii)

-α + 3β - 4γ = c ……..(iii) From equ (ii) β= b – γ …….(iv)

Put equ (iv) into (i) and (iii) α+ 2(b – γ) + γ =a

α+ 2b – 2γ + γ =a α+ 2b – γ =a α – γ =a – 2b ……(v)

For equ (iii)

-α +3(b – γ) - 4γ = c

-α +3b – 3γ - 4γ = c

-α +3b – 7γ = c

-α – 7γ = c – 3b ……...(vi) Compare equs (v) and (vi) by addition α- γ = a – 2b

-α - 7γ = c – 3b

-8γ = a – 2b + c – 3b -8γ = a – 5b + c γ = (a – 5b + c )

-8

γ = - (a – 5b + c )

8

γ = -a +5b - c

8

Put γ in (ii) β + -a +5b – c = b

8

β = b - -a +5b – c

8

β = b + a – 5b + c

8

β = 8b + a – 5b + c

8

β = a + 3b + c

8

Put β and γ into equ (i) α + 2 a + 3b + c + -a + 5b – c = a

8 8

α + a + 3b + c + -a +5b – c =a

4 8

α = a - a + 3b + c - -a +5b – c

4 8

α = a – a – 3b – c + a – 5b + c

4 8

α = 8a +2(- a – 3b – c) + a – 5b +c

8

α = 8a – 2a – 6b – 2c + a – 5b + c

8

α = 7a – 11b – c

8

7a – 11b – c U + a + 3b + c V + - a + 5b – c W

8 8 8

QUESTION 3

1. Commutativity of vector addition
2. Associativity of vector addition
3. Identity element of addition
4. Inverse element of addition