NAME: SADIKU DAVID JESUFERANMI

MATRIC NO: 18/SCI01/082

SOLUTION

1. (I) **Linear combination of vectors** , if one vector is equal to the sum of the scalar multiplication of other vectors. It is said to be a linear combination. Suppose, a= -2b+3c, it is said that **a** is a linear combination of **b & c.**

(ii) **Linear dependence of vectors**: A set of vectors is said to be linearly dependent if at least one of the vectors in the set can be defined as a linear combination of the others.

1. We seek scalars

αU+βV+γW= (a,b,c)

α 1 β 2 γ 1 a

 0 + 1 + 1 = b

 -1 3 -4 c

 α + 2β + γ= a…….(i)

 β + γ= b…….(ii)

 -α + 3β -4γ= c…….(iii)

From eqn 2

β = b- γ……..(iv)

putting egn (iv) into (i) & (ii)

 α + 2β + γ= a

 α + 2(b- γ) + γ= a

α + 2b-2 γ + γ= a

α + 2b -γ= a

α - γ = a-2b…..(v)

 -α + 3β -4γ= c

 -α + 3(b- γ) -4γ= c

 -α + 3b-3γ -4γ= c

 -α - 7γ= c-3b……..(vi)

 Combining egn (v) & (vi)

 α - γ = a-2b

-α - 7γ= c-3b

-8γ= a-2b + c-3b

-8γ= a-5b + c

 **γ=** $\frac{-a+5b - c}{8}$

from equation 5

α - γ = a-2b

α -$ \frac{ -a+5b - c}{8}$ = a-2b

α= $\frac{a-2b }{1} -$ $ \frac{ a+5b - c}{8}$

**α=**$ \frac{ 7a-11b-c}{8}$

from eqn (iv)

β = b- γ

β = b - $\frac{-a+5b - c}{8}$

β=$\frac{8b+a-5b+c}{8}$

**β=** $\frac{-a+3b+c}{8}$

final answer= $\frac{ 7a-11b-c}{8}U $**+** $\frac{-a+3b+c}{8}V-$$\frac{a+5b - c}{8}W$

1. Commutativity of vector addition

**X + Y= Y + X**

Associativity of vector addition

**(X + Y) + Z = X + (Y + Z)**

Distributivity of scalar multiplication with respect to vector addition

**α(X + Y) = αX + αY**

Distributivity of scalar multiplication with respect to field addition

**(α + β)X= αX + βX**