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MAT/NO: 18/SCI01/012

COURSE CD: MAT204

LVL: 200

DEPRMNT: COMPUTER SCIENCE

ASSIGNMENT:

1) **DEFINE THE FOLLOWING: (I) LINEAR COMBINATION OF VECTORS**
   (II) LINEAR DEPENDENCE OF VECTORS
2) **PROVE THAT THE FOLLOWING SET IS A SPAMMING SET R^3. U=(1,0,-1), V=(2,1,3) & W=(1,1,-4).**
3) **STATE 4 AXIOMS OF VECTOR SPACE.**

ANSWER

1i) Linear combination of two or more vector is the vector obtained from adding two or more vectors (with different directions) which are multiplied by the scalar values

1ii) A set of vector 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 vectors.

3i) U+V = V+U

3ii)I•U = U

3iii)C•(d•u) = (cd) u

3iv) (U+V) + W = U+(V+W)

$$\alpha\begin{pmatrix}1\\0\\-1\end{pmatrix} + \beta\begin{pmatrix}2\\1\\3\end{pmatrix} + \gamma\begin{pmatrix}1\\1\\-4\end{pmatrix} = \begin{pmatrix}a\\b\\c\end{pmatrix}$$

$\alpha + 2\beta + \gamma = a$ --- (1)

$\beta + \gamma = b$ --- (2)

$-\alpha + 3\beta - 4\gamma = c$ --- (3)

~~from eqn (1)~~

~~$\alpha = a - 2\beta - \gamma$ --- (4)~~

Sub ~~into~~ eqn (2)

from eqn (1)

$\cancel{2\beta}\ \gamma = a - \alpha - 2\beta$ --- (4)

Sub into (2)

$\beta + a - \alpha - 2\beta = b$

$\beta - \alpha - 2\beta = b - a$

$-\beta - \alpha = b - a$ --- (5)

Sub into eqn (3)

$-\alpha + 3\beta - 4(a - \alpha - 2\beta) = c$

$-\alpha + 3\beta - 4a + 4\alpha + 6\beta = c$

$-\alpha + 3\beta - 4a + 4\alpha + 6\beta = c$

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2)

$-\alpha + 4\alpha + 3\beta + 6\beta = \cancel{4a + c}\ c + 4a$

$3\alpha + 9\beta = c + 4a$ ---- eq (6)

~~Eo~~

$-\beta - \alpha = b - a$

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$3\alpha + 9\beta = c + 4a$

$\cancel{-4\beta}\ -4\alpha - 10\beta = (b-a) - (c+4a)$

using elimination method and eliminated α

$6\beta = 3b - c - 7a$

$$\beta = \frac{3b - c - 7a}{6}$$

from equ (6)

$3\alpha + 9\beta = \cancel{c + 4\alpha}\ c + 4a$

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