Tugas 1 TVM

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21/481767/TK/53170

1 Describe all linear combination of

a) $\begin{bmatrix}1\\2\\3\end{bmatrix}$ and $\begin{bmatrix}3\\6\\9\end{bmatrix}$

Because of $\begin{bmatrix}3\\6\\9\end{bmatrix}$ is the multiple vector of $\begin{bmatrix}1\\2\\3\end{bmatrix}$, thus the combination from $c\begin{bmatrix}1\\2\\3\end{bmatrix} + d\begin{bmatrix}3\\6\\9\end{bmatrix}$ is a straight line while $c \cap d \in \mathbb{Z}$

b) $\begin{bmatrix}1\\0\\0\end{bmatrix}$ and $\begin{bmatrix}0\\2\\3\end{bmatrix}$. The combination of two vectors above is

$c\begin{bmatrix}1\\0\\0\end{bmatrix} + d\begin{bmatrix}0\\2\\3\end{bmatrix}$. From the equation the combination of the two vectors can form a plane geometrical shape.

c) $\begin{bmatrix}2\\0\\0\end{bmatrix}$ and $\begin{bmatrix}0\\2\\2\end{bmatrix}$ and $\begin{bmatrix}2\\2\\3\end{bmatrix}$.

The combination from:

$c\begin{bmatrix}2\\0\\0\end{bmatrix} + d\begin{bmatrix}0\\2\\2\end{bmatrix} + e\begin{bmatrix}2\\2\\3\end{bmatrix}$ can fill all of R^3

5 Compute $u+v+w$ and $2u+2v+w$. How do you know u, v, w lie in a plane?

In a plane $u=\begin{bmatrix}1\\2\\3\end{bmatrix}$, $v=\begin{bmatrix}-3\\1\\-2\end{bmatrix}$, $w=\begin{bmatrix}2\\-3\\-1\end{bmatrix}$

First, calculate $u+v+w$.

$$\begin{bmatrix}1\\2\\3\end{bmatrix} + \begin{bmatrix}-3\\1\\-2\end{bmatrix} + \begin{bmatrix}2\\-3\\-1\end{bmatrix} = \begin{bmatrix}0\\0\\0\end{bmatrix}$$

Now, calculate $2u+2v+w$.

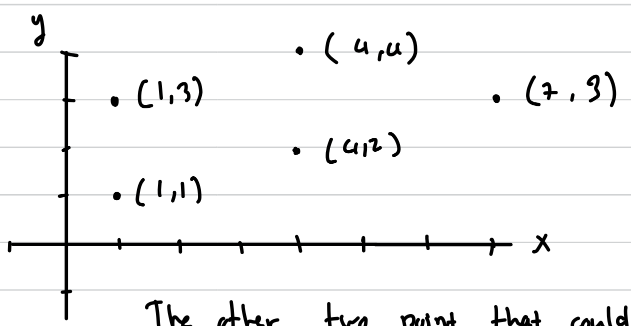
$$\begin{bmatrix}2\\4\\6\end{bmatrix} + \begin{bmatrix}-6\\2\\-4\end{bmatrix} + \begin{bmatrix}4\\-6\\-2\end{bmatrix} = \begin{bmatrix}0\\0\\0\end{bmatrix}$$

Because of the solution is resulting the same value, hence u, v, s is in the same plane.

8 The other diagonal from v and w aside from $(v+w)$ is $(v-w)$. The some of two diagonal is:

$$v+w+v-w = 2v$$

9 If three corners of a parallelogram are (1,1), (4,2), and (1,3), what are all three of the possible fourth corner? Draw two of them



The other two point that could be the fourth corner of the parallelogram are (4,4) and (7,3)

10 •) Point of the $\bar{i}+\bar{j}$ in the cube is at $(1,1,0)$.

•) Vector sum of $\bar{i}=(1,0,0)$ and $\bar{j}=(0,1,0)$ and $\bar{k}=(0,0,1)$ is

$i+j+k = (1,1,1)$.

•) All point in the cube is :
$(0,0,0)$, $(1,0,0)$, $(1,1,0)$, $(0,1,0)$
$(0,0,1)$, $(1,0,1)$, $(1,1,1)$, $(0,1,1)$

27 The plane of all linear combination of $\bar{i}=(1,0,0)$ and $i+j$ $(1,1,0)$ is express by following equation :

$$c\begin{bmatrix}1\\0\\0\end{bmatrix} + d\begin{bmatrix}1\\1\\0\end{bmatrix}$$

The plane should be in all R^2. That mean it's only fill xy in the xyz space

31 For equation $cu+dv+ew=b$ while :

$$u=\begin{bmatrix}2\\-1\\0\end{bmatrix},\ v=\begin{bmatrix}-1\\2\\-1\end{bmatrix},\ w=\begin{bmatrix}0\\-1\\2\end{bmatrix}, \text{ and}$$

$$b=\begin{bmatrix}1\\0\\0\end{bmatrix}$$

We know:

i) $-c+2d-e=0$

ii) $-d+2e=0$

iii) $2c-d=1$

ii) $-d=-2e \longrightarrow d=2e$

•) $-c+2(2e)-e=0$
$-c+4e-e=0$
$c=3e$

•) $(3e)-(2e)=1$
$e=1$
$d=2$
$c=3$

Hence, all c,d,e can be found!