2B 2020 - HOMELOUR 3 SOLUTIONS

WE ALSO HAUE:

Y x, x' ER Aso CER, T 13

 $[T] = \begin{pmatrix} 2 & 0 & 1 \\ 0 & -1 & 0 \\ 0 & 0 & 3 \end{pmatrix}$

() Consider the vectors $(x,y,z), (x',q',z') \in \mathbb{R}^3$ are consider CER. We have T((x,y,z)+(x',y,z'))=T(x+x',y+q',z+z') = -(2(x+x')+(2+z'),-(y+q'),3(z+z'))

Q1) WE ME GIVEN T: 1R3 > 1R3 SUCH THAT

T(4,3,2)=(24+2,-4,32).

= $((2x+2)+(2x+2),-(y-y), 3z+3z^{1})$ = $(2x+2,-y,3z)+(2x+2),-(y,3z^{1})$ = $T(x,y,z)+T(x,y,z^{1})$

T(((x,y,z))=T((x,cy,cz) = (2cz+Cz,-cy,3cz) = (((2z+z),-(y,c(3z))

WE HENCE CONCLUDE THAT, AS $T(x+x^1)=T(x^1)+T(x^1)$ AND $T(x^2)=(T(x))$

(ii) Yes, (-2,3,6) & range (T), homes T(-2,-3,2)=(-2,3,6) (.. = x=-2, y=-3,2=2).

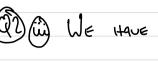
= C (24+ b,-4,32)

A LIMER TRANSFORMATION.

COORDINATIES OF THE BASIS VECTORS IN B WITH REPARCY TO THE

ORDERED BASIS
$$C$$
. WE HAVE:
$$\begin{pmatrix} 0 \\ 0 \\ 1 \end{pmatrix} = \begin{pmatrix} 0 \\ 1 \end{pmatrix} + \begin{pmatrix} 0 \\ 0 \\ 1 \end{pmatrix} + \begin{pmatrix} 1 \\ 1 \\ 1 \end{pmatrix} \Rightarrow \begin{bmatrix} 0 \\ 1 \\ 1 \end{pmatrix} = \begin{pmatrix} 0 \\ 1 \\ 1 \end{pmatrix} = \begin{pmatrix} 0 \\ 0 \\ 1 \end{pmatrix} = \begin{pmatrix} 0 \\ 1 \\ 1 \end{pmatrix} = \begin{pmatrix} 0 \\ 1$$

AND SO THE CHANGE OF ISAS IS MATURX IS:
$$P_{7eB} = \begin{pmatrix} 1 & 0 & -1 \\ 1 & 0 & 1 \end{pmatrix}$$



And so using our solutions to parts (i) And (ii) we have:
$$\begin{bmatrix} \sqrt{3}e^{-\frac{1}{2}} & \sqrt{2}e^{-\frac{1}{2}} \\ -\frac{1}{2}e^{-\frac{1}{2}} & -\frac{1}{2}e^{-\frac{1}{2}} \end{bmatrix}$$

$$\begin{bmatrix} \underline{y} \end{bmatrix}_{\underline{y}} = \begin{pmatrix} -1 & 1 & 0 \\ 1 & 0 & -1 \\ 1 & 0 & 1 \end{pmatrix} \begin{pmatrix} 2 \\ 1 \\ 1 \end{pmatrix}$$

$$\Rightarrow \begin{bmatrix} \underline{y} \end{bmatrix}_{\underline{y}} = \begin{pmatrix} -1 \\ 1 \\ 3 \end{pmatrix}$$

De Ale GIVES (D=DC WITH D INVESTIGUE AND WE ARE TOWN D'X IS

AS ELGENVECTOR OF C WITH EIGENVALUE J. HENCE

(Dx)= 1(Dx)

⇒ D(x=1)x (AS (D=DC)

⇒ D'D(x=1)x (D' EXISTS AS det(D)+0)

⇒ I(x=1)x

⇒ (x=1)x

AND SO I IS AN ELGENVECTOR OF C WITH CORRESPONDING

ELGENVALUE J.