2DL60I : 201001 :

Sorry, instructie vergeten!

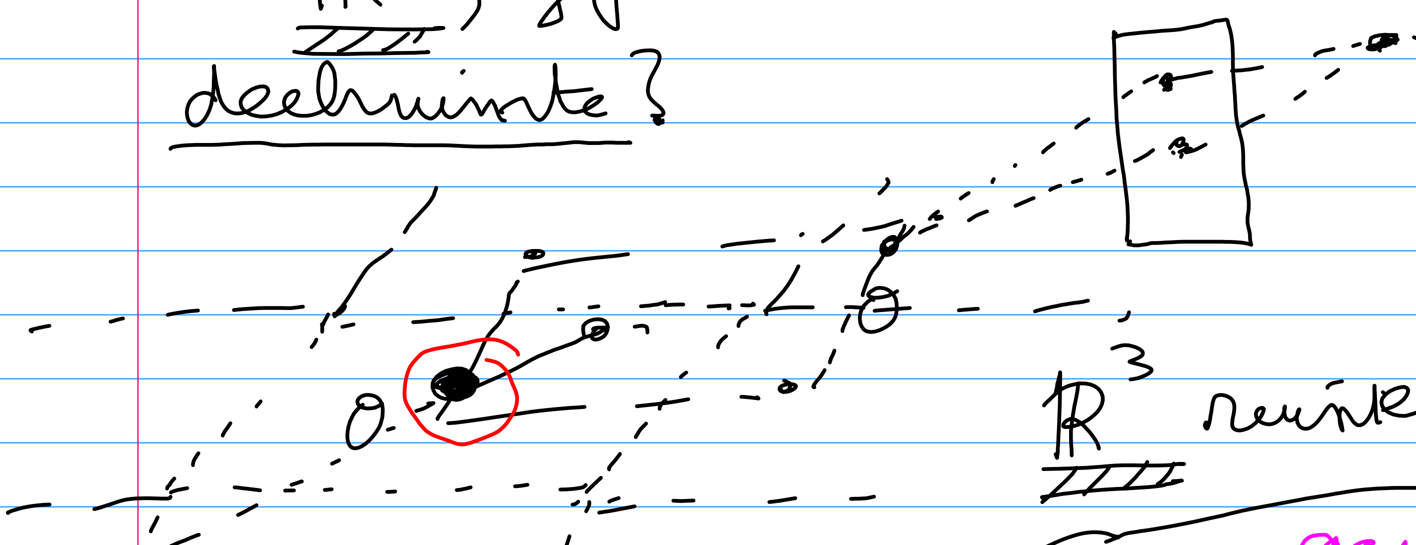
Wie weet door de "Corona-drukte"?

Vragen? Stel ze maar!

(3.2)

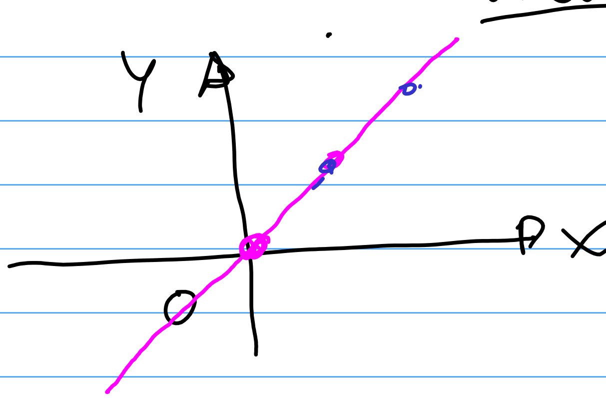
$\mathbb{R}^3$, jij bent O.

deelruimte?



$\mathbb{R}^3$ ruimte

deelruimte: vlak waar oorsprong O in ligt.



$\to P \quad \{1, x, x^2, x^3, \ldots x^n, \ldots\}$

$$P_n(x) = a_0 + a_1 x^1 + \cdots + a_n x^n$$

n vast $\quad (a_0, a_1, a_2, \ldots, a_n)$

$\mathbb{R}^3 \quad (1, -1, 2) \quad p_2(x) = 1 \cdot 1 + (-1)x + 2x^2$

(3.2)

2 b)

$$\boxed{(0, 0, 0) \in V}$$

$(x_1, x_2, x_3) \in V$

$(x_1, x_2, x_3) = (x_3, x_3, x_3) =$

$x_3 \cdot (1, 1, 1)$

$\underline{v}_1, \underline{v}_2 \in V$

$$\boxed{\underline{v}_1 = \alpha(1, 1, 1)}$$

$\underline{v}_2 = \beta(1, 1, 1)$

$c \in \mathbb{R}$

$c \cdot \underline{v}_1 =$

$c(\alpha(1, 1, 1)) =$

$\boxed{(c \cdot \alpha)}\boxed{(1, 1, 1)}$

(ac ṡam)

$\underline{v}_1 + \underline{v}_2 = \alpha(1, 1, 1) + \beta(1, 1, 1) =$

$(\alpha + \beta)(1, 1, 1) \to \oplus\, P$

2b) $x_1 = x_2 = x_3$

2d) $x_3 = x_1$ or $x_3 = x_2$

$$\begin{pmatrix} x_1 \\ x_2 \\ x_3 \end{pmatrix} \quad \begin{pmatrix} x_1 \\ x_2 \\ x_1 \end{pmatrix} \quad \begin{pmatrix} x_1 \\ x_2 \\ x_2 \end{pmatrix}$$

$$\boxed{\begin{pmatrix} 1 \\ 0 \\ 1 \end{pmatrix} \text{ of } \begin{pmatrix} 0 \\ 1 \\ 1 \end{pmatrix}}$$

$$\begin{pmatrix} 1 \\ \alpha \\ 1 \end{pmatrix}, \begin{pmatrix} \beta \\ 1 \\ 1 \end{pmatrix} ??$$

$$\begin{pmatrix} 1 \\ \alpha \\ 1 \end{pmatrix} + \begin{pmatrix} \beta \\ 1 \\ 1 \end{pmatrix} = \begin{pmatrix} 1+\beta \\ 1+\alpha \\ 2 \end{pmatrix}$$

$\alpha = 0$

$\beta = 0$

$$\boxed{\begin{pmatrix} 1 \\ 0 \\ 1 \end{pmatrix} + \begin{pmatrix} 0 \\ 1 \\ 1 \end{pmatrix} = \begin{pmatrix} 1 \\ 1 \\ 2 \end{pmatrix}} \neq$$

dus geen lin-deelruimte

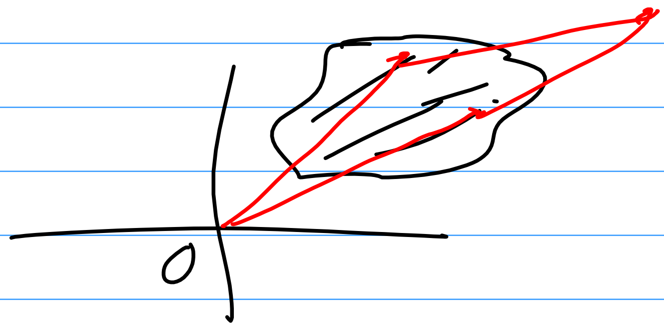
lin deelruimte :

$(0, 0, 0) \in V$

i) $\underline{x}, \underline{y} \in V \rightsquigarrow \underline{x} + \underline{y} \in V$

ii) $c \in \mathbb{R} \rightsquigarrow c\,\underline{x} \in V$.

$\mathbb{R}^2$



$\boxed{\text{subspace} = \text{linear subspace}}$

(3.2) (4)   nulruimte?

$$A = \begin{pmatrix} 2 & 1 \\ 3 & 2 \end{pmatrix}$$

$$\rightsquigarrow Ax = 0 \qquad \left(\begin{array}{cc|c} 2 & 1 & 0 \\ 3 & 2 & 0 \end{array}\right) \xrightarrow{-2}$$

$$+\times 2 \; \left(\begin{array}{cc|c} 2 & 1 & 0 \\ -1 & 0 & 0 \end{array}\right) \quad \left(\begin{array}{cc|c} 0 & 1 & 0 \\ 1 & 0 & 0 \end{array}\right) \;\Big\|$$

$x_2 = 0, \; x_1 = 0$ $\qquad \underline{x} = \begin{pmatrix} 0 \\ 0 \end{pmatrix}$

$$A = \begin{pmatrix} 2 & 1 \\ 2 & 1 \end{pmatrix} \quad \text{nullräume?}$$

$$A\underline{x} = \underline{0} \qquad \left(\begin{array}{cc|c} 2 & 1 & 0 \\ 2 & 1 & 0 \end{array}\right) \xrightarrow{} -1$$

$$\left(\begin{array}{cc|c} 2 & 1 & 0 \\ 0 & 0 & 0 \end{array}\right) \qquad 2x_1 + x_2 = 0$$

$$\begin{pmatrix} x_1 \\ x_2 \end{pmatrix} = \begin{pmatrix} x_1 \\ -2x_1 \end{pmatrix} = x_1 \begin{pmatrix} 1 \\ -2 \end{pmatrix}$$

$$N(A) = \left\{ \alpha \begin{pmatrix} 1 \\ -2 \end{pmatrix} \,\middle|\, \alpha \in \mathbb{R} \right\}$$

$$= \left\langle \begin{pmatrix} 1 \\ -2 \end{pmatrix} \right\rangle = \left\langle \begin{pmatrix} -1 \\ 2 \end{pmatrix} \right\rangle$$

$$\left(\ell \begin{pmatrix} 2 & 1 \\ 2 & 1 \end{pmatrix} \begin{pmatrix} 1 \\ -2 \end{pmatrix} = \begin{pmatrix} 0 \\ 0 \end{pmatrix} \right)$$

$$\left\langle \begin{pmatrix} 1 \\ 1 \\ 0 \end{pmatrix}, \begin{pmatrix} 1 \\ 0 \\ 0 \end{pmatrix} \right\rangle = \left\langle \begin{pmatrix} 0 \\ 1 \\ 0 \end{pmatrix}, \begin{pmatrix} 1 \\ 0 \\ 0 \end{pmatrix} \right\rangle$$

$$A(\ ) = \underline{0} \ ?!$$

problemen? Kom maar op!

$$\det(\alpha A) = \det(\alpha(I\cdot A)) =$$

$$\det((\alpha\cdot I)\cdot A) = \det(\alpha\cdot I)\cdot\det(A) =$$

$$\alpha^n\cdot\det(A)$$

$$|\alpha\cdot I| = \left|\begin{pmatrix}\alpha & & 0\\ & \ddots & \\ 0 & & \alpha\end{pmatrix}\right| = \alpha^n$$

$$\alpha\cdot A = \underbrace{\begin{pmatrix}\alpha & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\cdots\cdots\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & \alpha\end{pmatrix}}_{(\alpha\cdot I)}A.$$

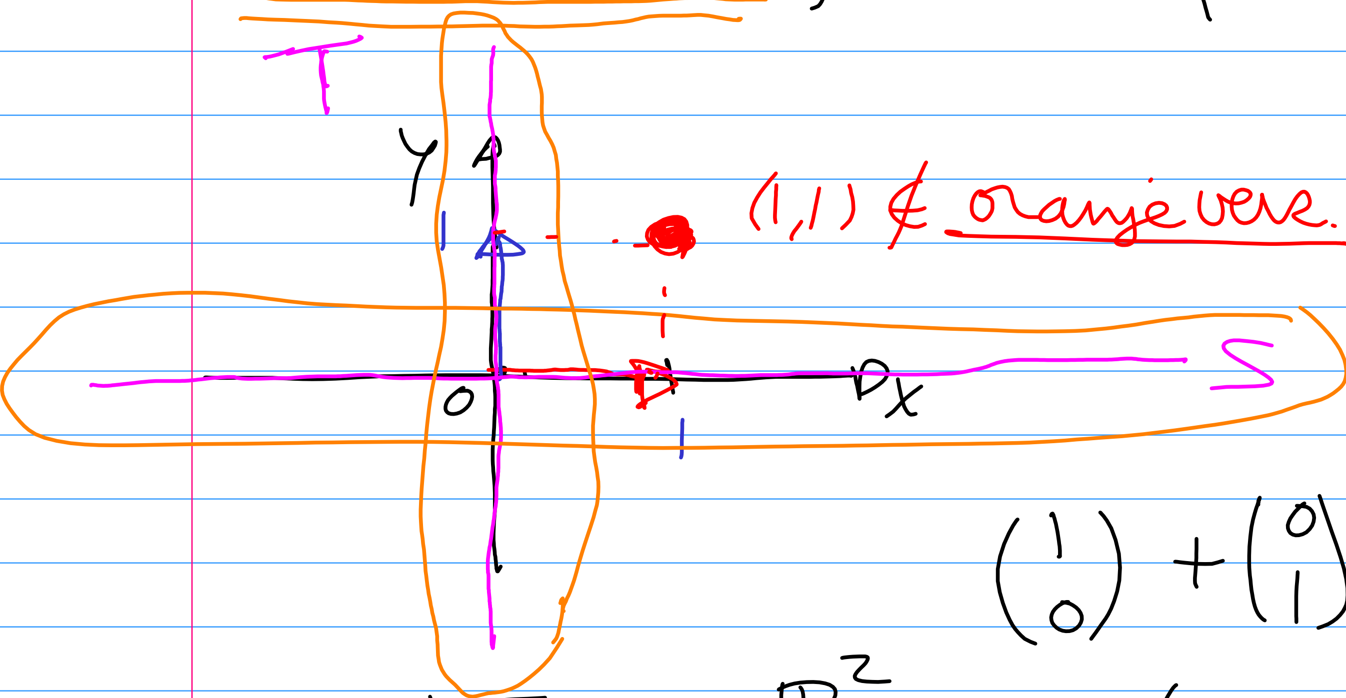
$(3,2)\ (2\ 4)$

$\begin{cases} S \text{ deelr van } \mathbb{R}^2 & \langle e_1\rangle \\ T \text{ deelr van } \mathbb{R}^2 & \langle e_2\rangle \end{cases}$

$\cup$ union

$$\{1,2\} \cup \{1,2,4,5\} = \{1,2,4,5\}$$

$S = \left\langle \begin{pmatrix}1\\0\end{pmatrix} \right\rangle$, $T = \left\langle \begin{pmatrix}0\\1\end{pmatrix} \right\rangle$



$(1,1) \notin$ oranje verz.

$$\begin{pmatrix}1\\0\end{pmatrix} + \begin{pmatrix}0\\1\end{pmatrix} = \begin{pmatrix}1\\1\end{pmatrix} \notin S \cup T$$

$$\underbrace{S \cup T}_{\text{geén lin. deelruimte ?}} \subset \mathbb{R}^2$$

$$S \cup T = \left\{ \begin{pmatrix}a\\0\end{pmatrix}, \begin{pmatrix}0\\b\end{pmatrix} \;\middle|\; a, b \in \mathbb{R} \right\}$$

$$\begin{pmatrix}1\\1\end{pmatrix} \notin S \cup T$$

!! goed oefenen, nu komt de "rot" stof, de moeilijke theorie etc.

!! Bekijk ook eens oude tentamens. !!

(3.3)(4)

(aap, 2-aap, koe)

$\to \begin{pmatrix}1&0\\0&1\end{pmatrix}, \begin{pmatrix}0&1\\0&0\end{pmatrix}, \begin{pmatrix}0&0\\1&0\end{pmatrix}$? lin. onafh ?

$$\rightsquigarrow \boxed{\alpha\begin{pmatrix}1&0\\0&1\end{pmatrix}+\beta\begin{pmatrix}0&1\\0&0\end{pmatrix}+\gamma\begin{pmatrix}0&0\\1&0\end{pmatrix}=\begin{pmatrix}0&0\\0&0\end{pmatrix}}$$

$$\begin{pmatrix}\alpha&\beta\\\gamma&\alpha\end{pmatrix}=\begin{pmatrix}0&0\\0&0\end{pmatrix}$$

$\boxed{\begin{aligned}\beta&=0\\ \gamma&=0\\ \alpha&=0\end{aligned}}$ → de enige opl

→ dus lin. onafh

dus lin. afh

$p \in \langle 1+x, 1, x\rangle$ lin. onafh !?

(0,0,0) niet enige opl.

nog een opl

$\alpha(1+x)+\beta\cdot 1+\gamma\cdot x = 0$

$(\alpha+\beta)+x(\alpha+\gamma)=0$

$\alpha+\beta=0 \qquad \alpha+\gamma=0$

$\beta=-\alpha, \quad \gamma=-\alpha$

neem $\alpha=1$

$\gamma=-1$

$\beta=-1$

$\alpha=0$

$\beta=0$

$\gamma=0$

niet de enige opl