2AL60I – 200921

Questions? ask them!

(1.5) (3C)

$$E \cdot A = B$$

$$\begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 2 & 1 \end{pmatrix} \cdot \begin{pmatrix} 4 & -2 & 3 \\ 1 & 0 & 2 \\ -2 & 3 & 1 \end{pmatrix} = \begin{pmatrix} 4 & -2 & 3 \\ 1 & 0 & 2 \\ 0 & 3 & 5 \end{pmatrix}$$

$$\left(\text{———} \right) \begin{pmatrix} \text{—} \\ A \\ \text{—} \end{pmatrix} = \left(\text{———} \right) \ldots$$

$$\begin{pmatrix} 3 & 4 \end{pmatrix} \begin{pmatrix} 1 & 0 \\ 0 & 2 \end{pmatrix} = \begin{pmatrix} 3 & 8 \end{pmatrix} =$$

$$3 \cdot (1 \; 0) + 4 (0 \; 2)$$

$$\begin{pmatrix} 1 & 2 \\ 2 & 3 \end{pmatrix} \begin{pmatrix} 2 \\ -1 \end{pmatrix} = \begin{pmatrix} 0 \\ 1 \end{pmatrix} = 2 \begin{pmatrix} 1 \\ 2 \end{pmatrix} - 1 \cdot \begin{pmatrix} 2 \\ 3 \end{pmatrix}$$

matrix * kolom =
lin comb. van kolommen
rij * matrix =
lin comb. van de rijen.

(3.1) (7)

$\boxed{\exists\, 0 \text{ in } V \quad x + 0 = x}$

$\left(x \in V \text{ dan bestaat } -x \in V \quad x + (-x) = 0 \right)$

Stel een andere $P (\neq 0)$

$$x + P = x$$

$$\underbrace{(x + P) + (-x)}_{} = x + (-x)$$

$$P = 0 + P = 0 \quad \lightning$$

Deelruimte:

$$\begin{cases} c \in \mathbb{R},\ \underline{x} \in V \Rightarrow c \cdot \underline{x} \in V \\ \underline{x}, \underline{y} \in V \Rightarrow \underline{x} + \underline{y} \in V \end{cases}$$

($0 \in V$ als V deelruimte)

(3.2) (1b)

$(x_1, x_2) \in \mathbb{R}^2$

$x_1 \cdot x_2 = 0$

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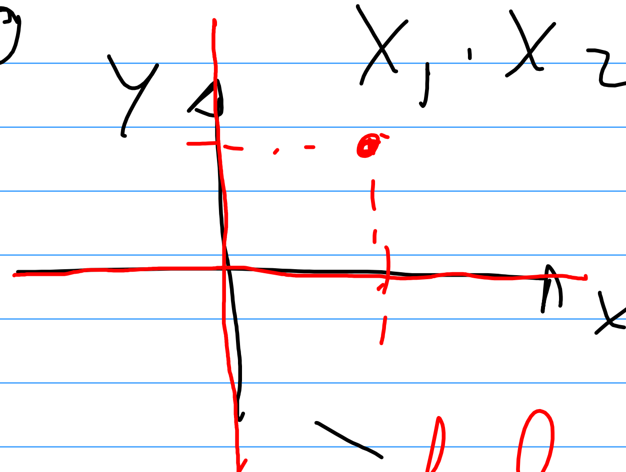


$\begin{pmatrix} a \\ b \end{pmatrix}, \begin{pmatrix} c \\ d \end{pmatrix}$

$\hookrightarrow ab = 0$ $\quad a = 0$ of $b = 0$

$\begin{pmatrix} 0 \\ 2 \end{pmatrix}, \begin{pmatrix} 4 \\ 0 \end{pmatrix} \qquad \begin{pmatrix} 0 \\ 2 \end{pmatrix} + \begin{pmatrix} 4 \\ 0 \end{pmatrix} = \begin{pmatrix} 4 \\ 2 \end{pmatrix}$

(c) $\begin{pmatrix} x_1 \\ x_2 \end{pmatrix} = \underline{\underline{\begin{pmatrix} 3x_2 \\ x_2 \end{pmatrix}}} = x_2 \cdot \begin{pmatrix} 3 \\ 1 \end{pmatrix}$

$\begin{pmatrix} 3a \\ a \end{pmatrix}, \begin{pmatrix} 3b \\ b \end{pmatrix} \qquad c \in \mathbb{R}$

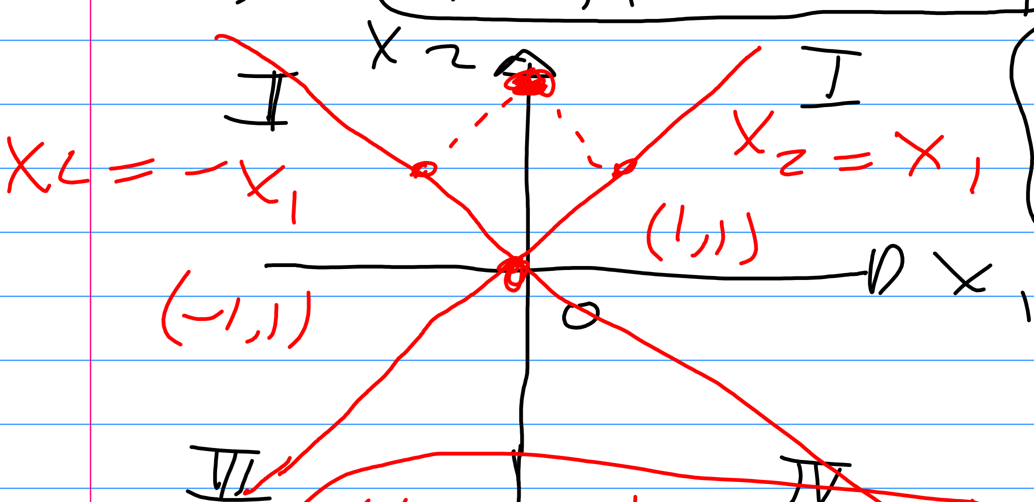
$c \cdot \begin{pmatrix} 3a \\ a \end{pmatrix} = \begin{pmatrix} 3ac \\ ac \end{pmatrix} \rightarrow$ ✓

$\begin{pmatrix} 3a \\ a \end{pmatrix} + \begin{pmatrix} 3b \\ b \end{pmatrix} = \begin{pmatrix} 3a+3b \\ a+b \end{pmatrix}$

$3(a+b) = 3a+3b.$

??

d) $|x_1| = |x_2|$ $\qquad \begin{pmatrix} x_1 \\ x_2 \end{pmatrix}$



$x_1 = -1$

$x_2 = 1$

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

$\underline{\underline{\begin{pmatrix} -2 \\ -2 \end{pmatrix}}} \ \underline{\underline{\begin{pmatrix} 2 \\ -2 \end{pmatrix}}}$

(3.3)(4) <u>vraag ??</u>

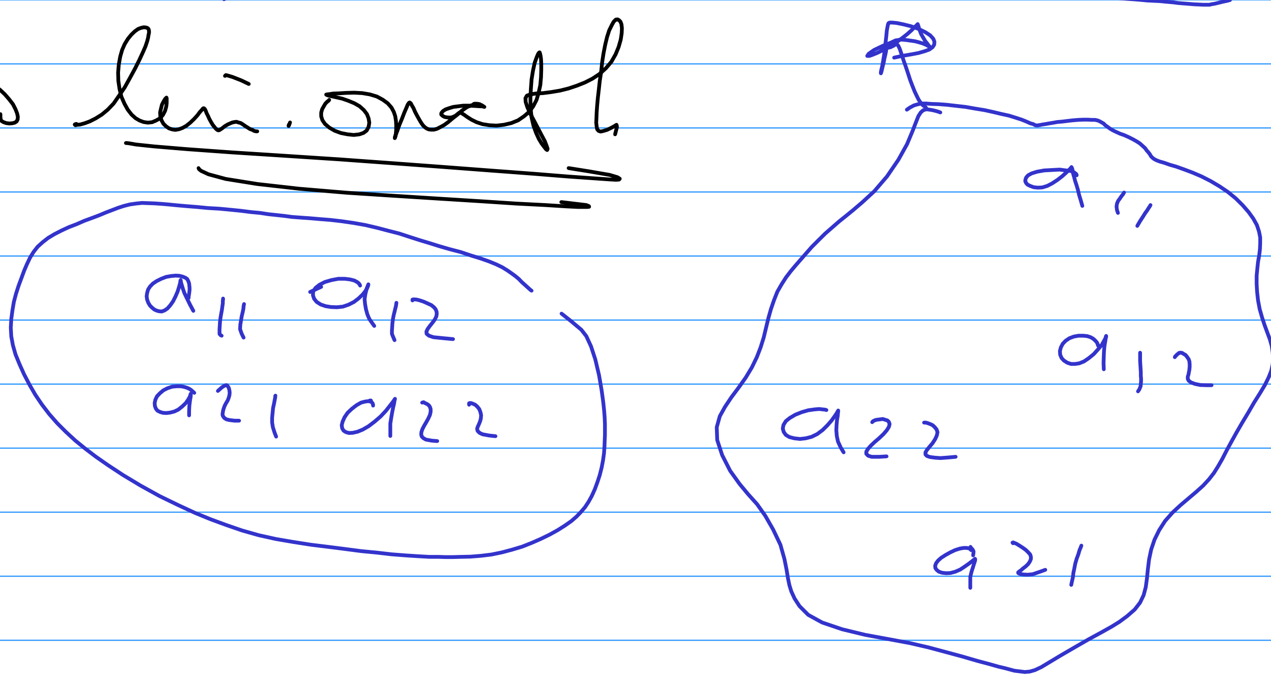
lin. onafh;

$$a \cdot \begin{pmatrix} 1 & 0 \\ 1 & 1 \end{pmatrix} + b \begin{pmatrix} 0 & 1 \\ 0 & 0 \end{pmatrix} = \begin{pmatrix} 0 & 0 \\ 0 & 0 \end{pmatrix}$$

$$\begin{pmatrix} a & b \\ a & a \end{pmatrix} = \begin{pmatrix} 0 & 0 \\ 0 & 0 \end{pmatrix}$$

$a = 0$, $b = 0$ <u>de enige opl</u>

dus <u>lin. onafh.</u>



$$\begin{pmatrix} a_{11} \\ a_{22} \\ a_{12} \\ a_{21} \end{pmatrix} \cancel{\times} \begin{pmatrix} l_{11} \\ l_{22} \\ l_{12} \\ l_{21} \end{pmatrix}$$

$$\begin{pmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{pmatrix} \begin{pmatrix} l_{11} & l_{12} \\ l_{21} & l_{22} \end{pmatrix}$$

c) $\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}, \begin{pmatrix} 0 & 1 \\ 0 & 0 \end{pmatrix}, \begin{pmatrix} 2 & 3 \\ 0 & 2 \end{pmatrix}$

lin. onafh. of afh.

$$2 \cdot \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix} + 3 \begin{pmatrix} 0 & 1 \\ 0 & 0 \end{pmatrix} = \underline{\underline{\begin{pmatrix} 2 & 3 \\ 0 & 2 \end{pmatrix}}}$$

(7) x_1, x_2, x_3 <u>lin. onafh. vectoren</u>

$$\left(\begin{pmatrix} 1 \\ 0 \\ 0 \end{pmatrix}, \begin{pmatrix} 0 \\ 1 \\ 0 \end{pmatrix}, \begin{pmatrix} 0 \\ 0 \\ 1 \end{pmatrix} \right)$$

$$y_1 = x_2 - x_1$$
$$y_2 = x_3 - x_2$$
$$y_3 = x_3 - x_1$$

$$\boxed{\begin{aligned}&-1\cdot y_1 + \\ &-1\cdot y_2 + \\ &+1\cdot y_3 = 0\end{aligned}}$$

$$a y_1 + b y_2 + c y_3 = 0$$

$$a(x_2 - x_1) + b(x_3 - x_2) +$$
$$c(x_3 - x_1) = 0$$

$$(-a - c)x_1 +$$
$$(a - b)x_2 +$$
$$(b + c)x_3 = 0$$

$$\boxed{\begin{aligned}c &= 1\\ a &= -1\\ b &= -1\end{aligned}}$$

$$\begin{cases} -a - c = 0 \rightarrow & a = -c \\ a - b = 0 & -c - b = 0 \\ b + c = 0 & b + c = 0 \end{cases}$$

$$\underline{a = -c}, \quad \underline{b = -c}$$

$y_1 = \cancel{x_2} - x_1$

$y_2 = x_3 \cancel{- x_2}$

$y_3 = x_3 - x_1$ +

$$y_1 + y_2 = y_3$$

$[x_1, x_2, x_3]$ basis

$y_1\big|_B = \begin{pmatrix} -1 \\ +1 \\ 0 \end{pmatrix}$ + $y_2\big|_B = \begin{pmatrix} 0 \\ -1 \\ 1 \end{pmatrix}$

$y_3\big|_B = \begin{pmatrix} -1 \\ 0 \\ 1 \end{pmatrix}$ =

((Z-lib) ⇝ Linear Algebra)

lecture notes ~ lin. alg.