

2DL60I-200924;

①

Questions? ask them!

About theory also possible!

? No problems?

(2.2) - (5) $\alpha \in \mathbb{R}$

det α

$$\boxed{\begin{array}{l} \alpha \cdot A = \\ \alpha \cdot I \cdot A \end{array}}$$

$$|\alpha \cdot A| = |\alpha \cdot I \cdot A| =$$

$$|\alpha \cdot I| \cdot |A| = \alpha^n \cdot |A|$$

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

$(n \times n)$

$$\begin{vmatrix} \alpha & 0 \\ 0 & \alpha \end{vmatrix} = \alpha^2$$

$n \in \mathbb{N}$

n vast en eindelijk!! $(n \stackrel{?}{=} 10^{10})$

$$\begin{vmatrix} \alpha & 0 & 0 \\ 0 & \alpha & 0 \\ 0 & 0 & \alpha \end{vmatrix} = \alpha \cdot \alpha^2 = \alpha^3$$

$$\begin{vmatrix} \alpha & 0 & 0 & 0 \\ 0 & \alpha & 0 & 0 \\ 0 & 0 & \alpha & 0 \\ 0 & 0 & 0 & \alpha \end{vmatrix} = \alpha^4$$

(7)

b) $\det(3A) = 3^{\textcircled{3}} \cdot \det(A)$ ($\underline{n=3}$)

(5) $\det(\alpha A) = \alpha^{\textcircled{n}} \cdot \det(A)$

(Note: Red arrows point from circled '3' and 'n' to circled '3A' and 'αA' respectively. A bracket groups the two equations.)

$$\left(\det(A^{-1}) = \frac{1}{\det(A)} \right)$$

$$|A^{-1} \cdot A| = |I| \rightarrow |A^{-1}| = \frac{1}{|A|}$$

$$|A^{-1}| \cdot |A| = 1$$

$$(11) A^2 + I = 0$$

$$A (n \times n) \quad \underline{\underline{n \text{ odd}}}$$

(Is it possible?)

$$\underline{\underline{n=1}} \quad (\alpha) = A$$

$$A^2 = (\alpha^2)$$

$$A^2 + I = 0$$

$$\alpha^2 + 1 = 0 \quad \downarrow \nexists$$

$$A^2 + I = 0$$

$$|A^2| = |-I|$$

$$\underline{\underline{n = \text{odd}}}$$

$$0 \leq |A|^2 = (-1)^{(k+1)} = -1 \quad \downarrow \nexists$$

$$\underline{\underline{n = 2k + 1}}$$

$$\underline{\underline{n = 2k}}$$

$$\underline{\underline{0 \leq |A|^2 = |A^2| = |-I| = (-1)^{2k} = 1}}$$

$$n = 2 \mathbb{R}^+$$

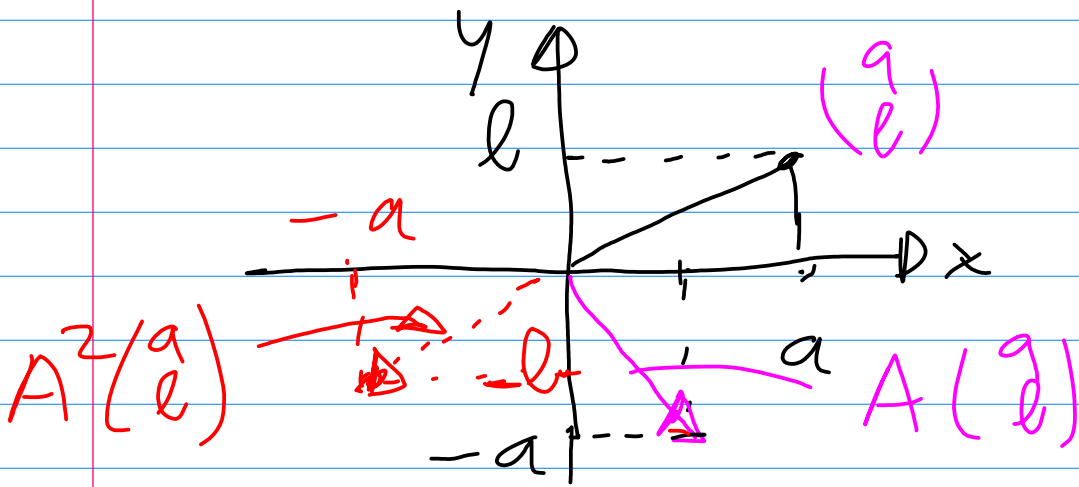
4

$n = \text{even}$, it is possible

$$A = \begin{pmatrix} 0 & 1 \\ -1 & 0 \end{pmatrix}$$

$$A^2 = \begin{pmatrix} 0 & 1 \\ -1 & 0 \end{pmatrix} \begin{pmatrix} 0 & 1 \\ -1 & 0 \end{pmatrix} = \begin{pmatrix} -1 & 0 \\ 0 & -1 \end{pmatrix}$$

$$= -I \quad \underline{A^2 + I = 0}$$



$$\begin{pmatrix} 0 & 1 \\ -1 & 0 \end{pmatrix} \begin{pmatrix} a \\ l \end{pmatrix} = \begin{pmatrix} l \\ -a \end{pmatrix}$$

$$\begin{pmatrix} 0 & 1 \\ -1 & 0 \end{pmatrix} \begin{pmatrix} l \\ -a \end{pmatrix} = \begin{pmatrix} -a \\ -l \end{pmatrix} = - \begin{pmatrix} a \\ l \end{pmatrix}$$