①

2DL60T-200924:

Questions? ask them!
About theory also possible!
? No problems?

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

det α

$$\boxed{\alpha \cdot A = \alpha \cdot I \cdot A}$$

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

$$\Rightarrow \left| \underbrace{\begin{pmatrix} \alpha & & \emptyset \\ & \ddots & \\ \emptyset & & \alpha \end{pmatrix}}_{(n \times n)} \right| = \alpha^n$$

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

$n \in \mathbb{N}$

n vast én eindig!! $(n \stackrel{?}{=} 10^{10})$

2

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

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

(7)

l) $\det(3A) = 3^3 \cdot \det(A)$ $(n = 3)$

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

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

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

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

$\left(|A^{-1}| = \dfrac{1}{|A|}\right)$

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

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

($\underline{\text{Is it possible}}$?)

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

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

$$A^2 + I = 0$$

$$\alpha^2 + 1 = 0 \qquad \text{↯}$$

$A^2 + I = 0$ $\qquad$ $\underline{\underline{n = \text{odd}}}$

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

$$0 \leq \underbrace{|A|^2}_{n = 2k+1} = (-1)^{(2k+1)} = -1 \qquad \text{↯}$$

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

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

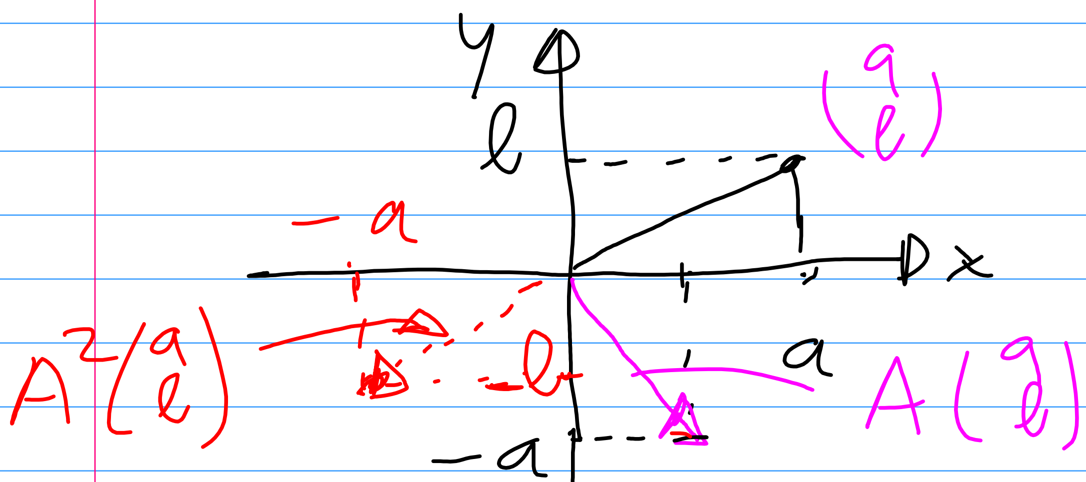
$n = 2k^{+}$

n = even, it is possible

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

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

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



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

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