Richard Feynman

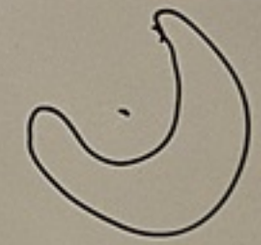
Co to jest komputer?

Cixin Liu

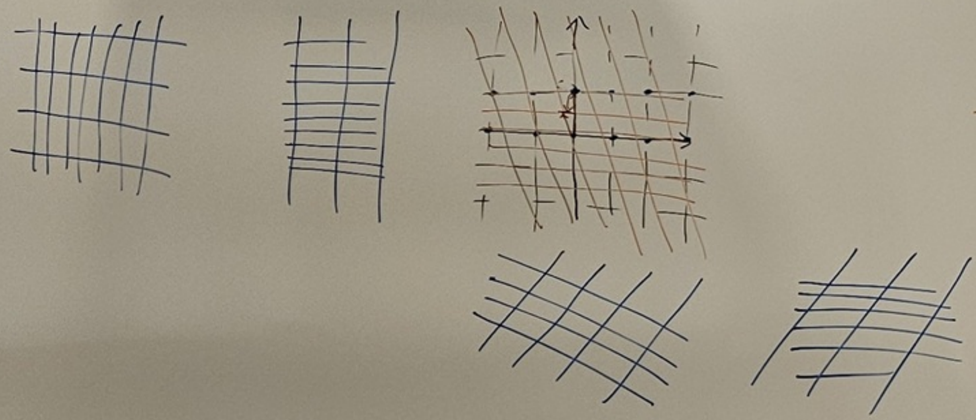
Von Neumann

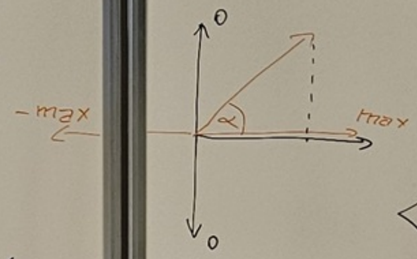
Co to jest informacja?

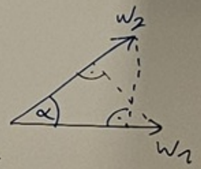
Shannon



liniowe przekszt. płaszcz.

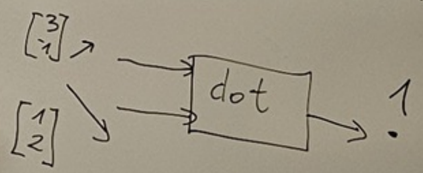






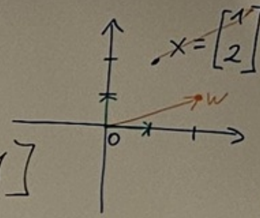
$\langle \begin{bmatrix} 3 \\ -1 \end{bmatrix}, \begin{bmatrix} 1 \\ 2 \end{bmatrix} \rangle =$

tab.T np.dot(w1, w2)



$\langle w_1, w_2 \rangle$

$x \leftarrow x + w$



$w = \begin{bmatrix} 2 \\ 1 \end{bmatrix}$

$w^T = [2 \quad 1]$

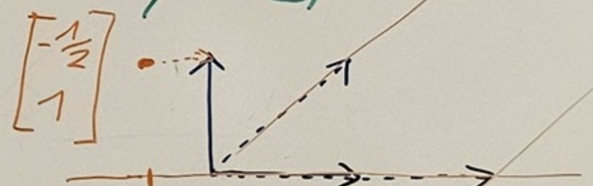
$x^T = [1 \quad 2]$

$\begin{bmatrix} 1 \\ 2 \end{bmatrix} + \begin{bmatrix} 2 \\ 1 \end{bmatrix} = \begin{bmatrix} 3 \\ 3 \end{bmatrix}$

!

$\langle [\cdot], [\cdot] \rangle$ $\quad$ $\langle [\cdot\ \cdot], [\cdot] \rangle$

$\langle [\cdot\ \cdot], [\cdot\ \cdot] \rangle \cdot \begin{bmatrix} 1 \\ 2 \end{bmatrix} \rightsquigarrow ?$ $\quad$ $\begin{bmatrix} 2 \\ 1 \end{bmatrix}, \begin{bmatrix} 1 \\ 2 \end{bmatrix}$



$\cdot \begin{bmatrix} 1 \\ -1 \end{bmatrix} \rightsquigarrow ?$

$\begin{bmatrix} 1 \\ 0 \end{bmatrix} \rightsquigarrow \begin{bmatrix} 2 \\ 0 \end{bmatrix}$

$\begin{bmatrix} 0 \\ 1 \end{bmatrix} \rightsquigarrow \begin{bmatrix} 1 \\ 1 \end{bmatrix}$

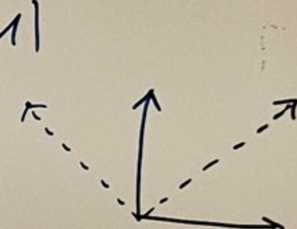
$\begin{bmatrix} 2 & 1 \\ 0 & 1 \end{bmatrix}$ il.skal $\begin{bmatrix} 1 \\ 2 \end{bmatrix}$ il.skal $= \begin{bmatrix} 4 \\ 2 \end{bmatrix}$

$\begin{bmatrix} 2 & 1 \\ 0 & 1 \end{bmatrix} \begin{bmatrix} 1 \\ 2 \end{bmatrix} = \begin{bmatrix} 4 \\ 2 \end{bmatrix}$

$\begin{bmatrix} 2 & 1 \\ 0 & 1 \end{bmatrix} \begin{bmatrix} 1 \\ -1 \end{bmatrix} = \begin{bmatrix} 1 \\ -1 \end{bmatrix}$

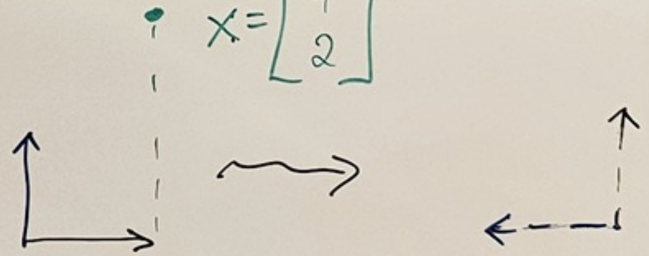
W domu

1)



$\begin{bmatrix} 1 & -1 \\ 1 & 1 \end{bmatrix}$

2) Wymyśl własne przekszt.



$$P = \begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix}$$

$$x' = P \cdot x$$

$$P \cdot \frac{1}{P} \quad P^{-1}$$

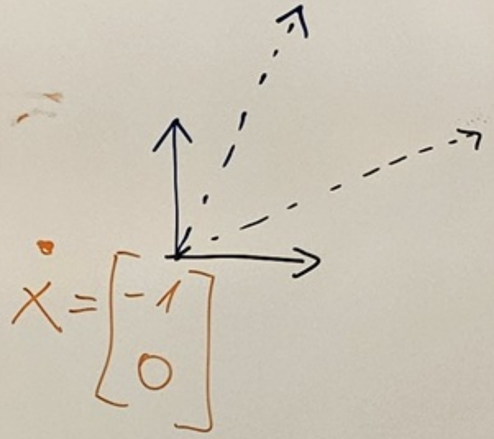
$$\begin{bmatrix} 1 \\ 2 \end{bmatrix}$$

$$\begin{bmatrix} -1 \\ 0 \end{bmatrix}$$

$$P \cdot I = P$$

$$\begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix} \begin{bmatrix} -2 \\ 1 \end{bmatrix} = x'$$

$$\begin{bmatrix} 2 & 1 \\ 1 & 2 \end{bmatrix} \begin{bmatrix} -2 \\ -1 \end{bmatrix}$$



$$T = \begin{bmatrix} 2 & 1 \\ 1 & 2 \end{bmatrix}$$

$$P P^{-1} = I$$

$$P^{-1} P = I$$

$$\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} = I$$

macierz jednostk.

$$B = P \cdot T$$

$$\begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix} \begin{bmatrix} 2 & 1 \\ 1 & 2 \end{bmatrix} = \begin{bmatrix} -1 & -2 \\ 2 & 1 \end{bmatrix}$$

B

$$x' = Px$$

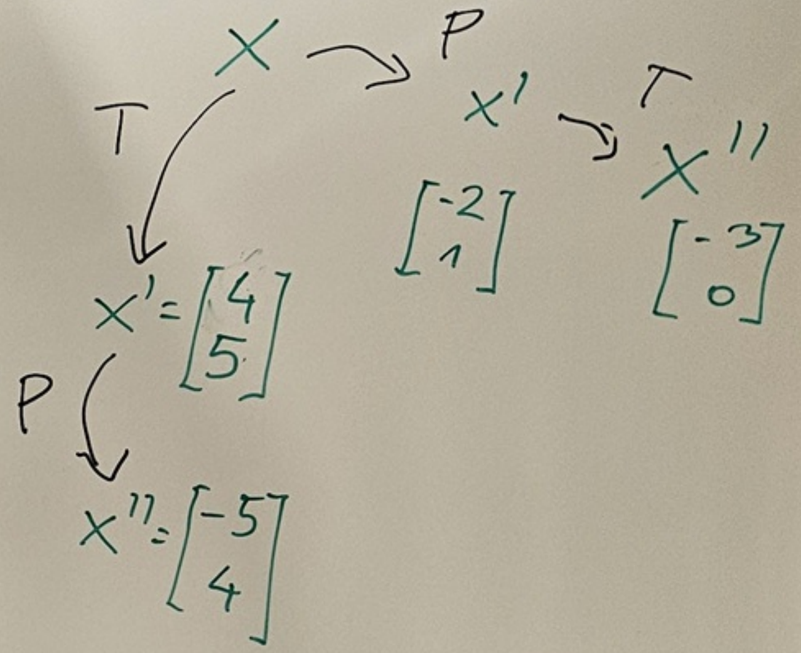
$$x'' = Tx'$$

$$x'' = (TP)x'$$

A

$$\begin{bmatrix} 2 & 1 \\ 1 & 2 \end{bmatrix} \begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix} = \begin{bmatrix} 1 & -2 \\ 2 & -1 \end{bmatrix}$$

A



T

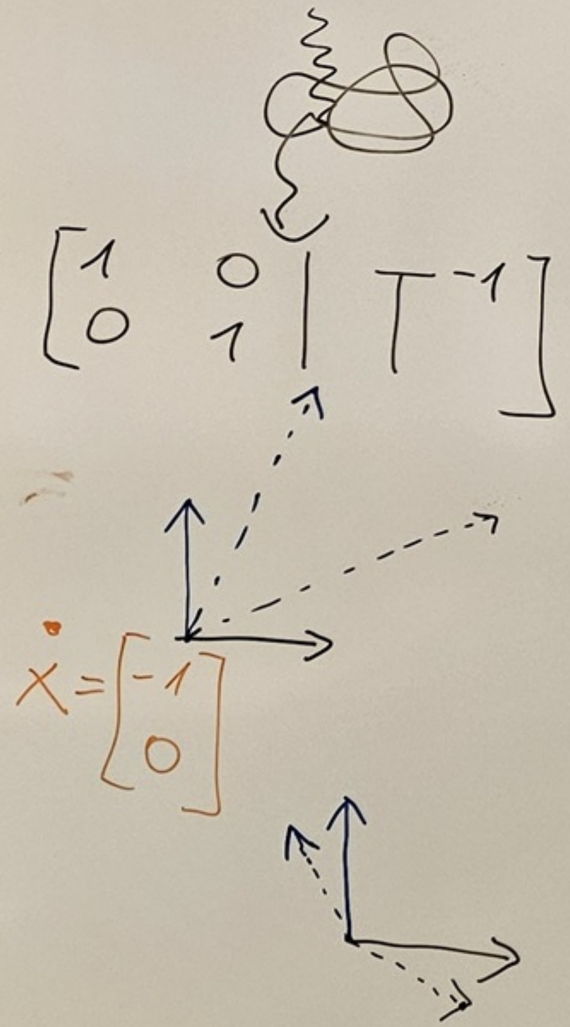
$$\left[\begin{array}{cc|cc} 2 & 1 & 1 & 0 \\ 1 & 2 & 0 & 1 \end{array}\right] \xrightarrow{w_2 - \frac{1}{2}w_1} \left[\begin{array}{cc|cc} 2 & 1 & 1 & 0 \\ 0 & 3/2 & -\frac{1}{2} & 1 \end{array}\right] \xrightarrow{w_2 \cdot \frac{2}{3}} \left[\begin{array}{cc|cc} 2 & 1 & 1 & 0 \\ 0 & 1 & -\frac{1}{3} & \frac{2}{3} \end{array}\right] \xrightarrow{w_1 - w_2}$$

$$\rightarrow \left[\begin{array}{cc|cc} 2 & 0 & 4/3 & -\frac{2}{3} \\ 0 & 1 & -\frac{1}{3} & \frac{2}{3} \end{array}\right] \xrightarrow{w_1/2} \left[\begin{array}{cc|cc} 1 & 0 & \frac{2}{3} & -\frac{1}{3} \\ 0 & 1 & \underbrace{-\frac{1}{3} \quad \frac{2}{3}}_{T^{-1}} \end{array}\right]$$

$$T^{-1} = \frac{1}{3}\begin{bmatrix} 2 & -1 \\ -1 & 2 \end{bmatrix}$$

+ mnożyć wiersz przez stałą
+ zamieniać wiersze miejscami
+ do jednego wiersza dodać/odjąć inny wiersz

$$\left[\begin{array}{cc|cc} 1 & 0 & T^{-1} \\ 0 & 1 & \end{array}\right]$$



$$T = \begin{bmatrix} 2 & 1 \\ 1 & 2 \end{bmatrix}$$

$$P P^{-1} = I$$

$$P^{-1} P = I$$

$$\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} = I$$

macierz jednostk.