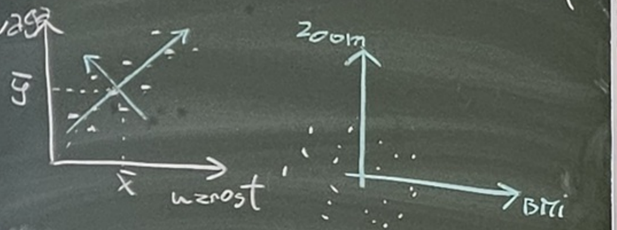
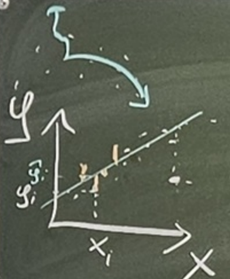
Model mentalny:
myśl o danych jako
punktach w przestrzeni



Ukł. wsp. dopasuj do danych,
nic na odwrót. $A = P\Lambda P^{-1}$



Dopas. modelu do danych

$\hat{y} = Model(x)$

$\hat{y} = ax$

$c_i = y_i - \hat{y}_i$

$f(x)$
$af(x)$
$f(ax)$
$f(x) \pm c$
$f(x \pm c)$

$Q_1(a; Dane) = \frac{1}{N}\sum_{i=1}^{N}|e_i|$

$Q_2(a) = \sqrt{\frac{1}{N}\sum_{i=1}^{N} e_i^2}$

$\frac{dQ_2}{da} = 0$

x	x_1	...	x_N
y	y_1	...	y_N
$\hat{y}$	$\hat{y}_1$	...	$\hat{y}_N$

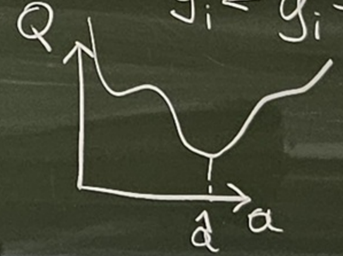
$\{(x_i, y_i)\}_{i=1}^{N}$

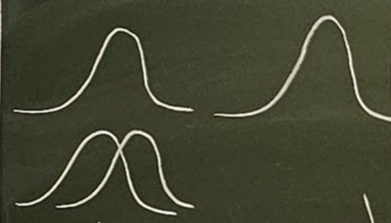
$\bar{x} = \frac{1}{N}\sum_{i=1}^{N} x_i$

$\bar{y}$

$x_i \leftarrow x_i - \bar{x}$

$y_i \leftarrow y_i - \bar{y}$





W domu
$\hat{y} = ax + b$
$\frac{\partial Q}{\partial a} = 0$
$\frac{\partial Q}{\partial b} = 0$
W Excelu

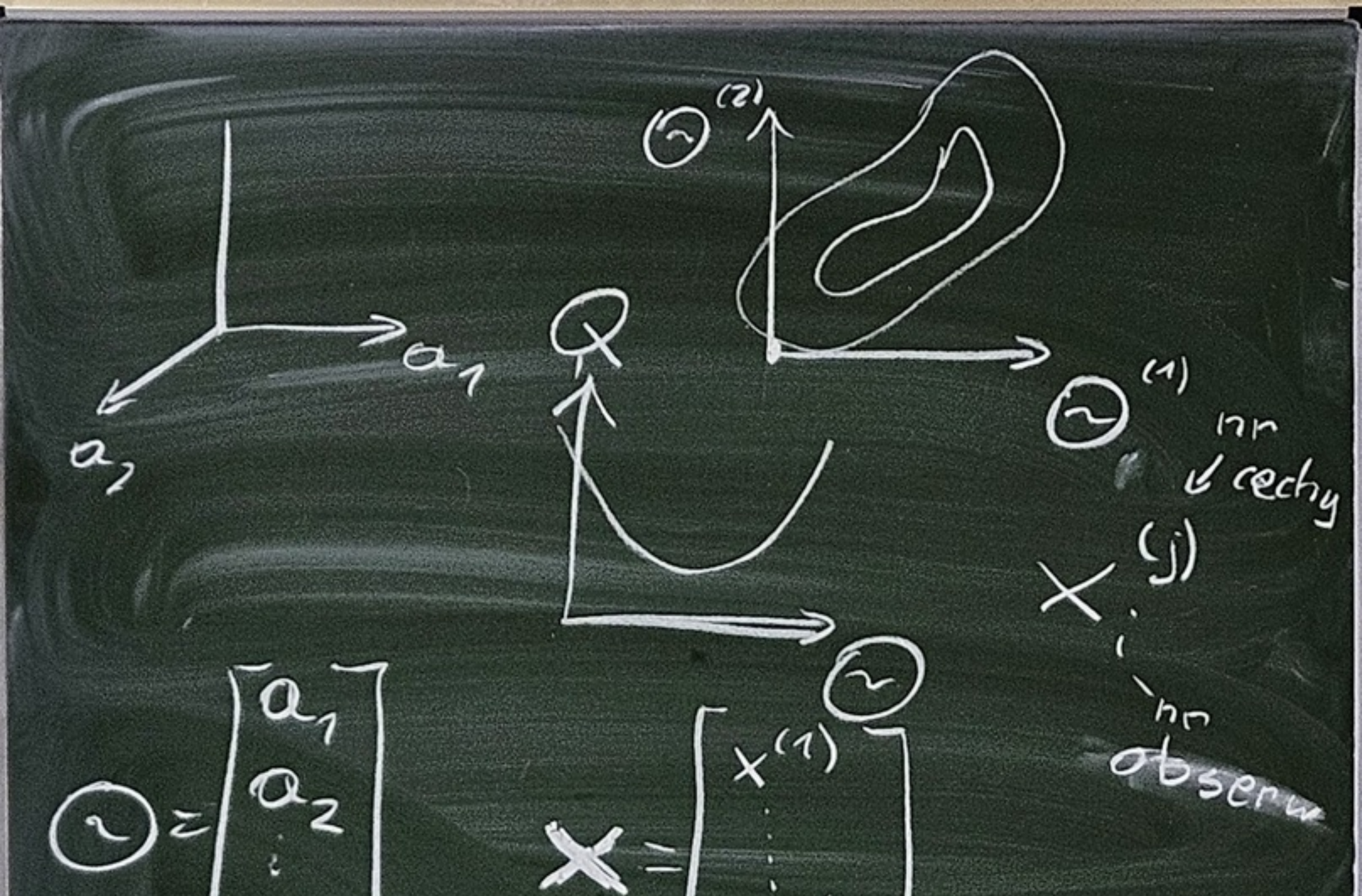
$\frac{\partial}{\partial a}\left(\sum_i (y_i - ax_i)^2\right) = 0$

$\sum_i 2(y_i - ax_i)(-x_i) = 0$

$-\sum_i x_i y_i - a\sum_i x_i^2 = 0$

$\hat{a}_{LS} = \frac{\sum_{i=1}^{N} x_i y_i}{\sum_{i=1}^{N} x_i^2}$

$\frac{1+3}{2+4} = \frac{1}{2} + \frac{3}{4}$


$\theta^{(2)}$
a_1
a_2
$\theta^{(1)}$
$x^{(j)}$
$\theta = \begin{bmatrix} a_1 \\ a_2 \\ \vdots \\ a_K \end{bmatrix}$
$X = \begin{bmatrix} x^{(1)} \\ \vdots \\ x^{(K)} \end{bmatrix}$
$\hat{y} = a_1 x^{(1)} + a_2 x^{(2)} + \ldots + a_K x^{(K)}$
$\hat{y} = \sum_{j=1}^{K} a_j x^{(j)}$
$\hat{y} = \theta^T X$
$\{(x_i, y_i)\}_{i=1}^{N}$