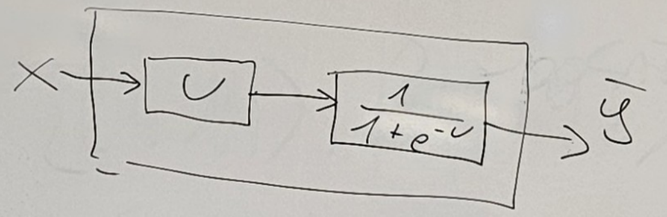
$$\frac{\partial Q}{\partial a} = \frac{\partial}{\partial a}\left(\sum_{i=1}^{N}(y_i - ax_i)^2\right) = \sum_{i=1}^{N} 2(y_i - ax_i)(-x_i) \qquad \bar{y} = \frac{1}{1+e^{-ax}}$$

$$\frac{dQ}{da} = +2\sum\left(y_i - (1+e^{-ax})^{-1}\right)(1+e^{-ax})^{-2}(xe^{-ax})$$

Regr log:

$$\bar{y} = \frac{1}{1+e^{-v}}$$

$$v = ax$$



Rozw numer. dopas do danych regr. log

$$\frac{dQ}{da} = \sum_{i=1}^{N}\left(y_i - \frac{1}{1+e^{-ax}}\right)^2 = \sum_{i=1}^{N}\frac{d\Sigma^2}{d\Sigma}\frac{d\Sigma}{da} = 2\Sigma\frac{d\left(y_i - \frac{1}{1+e^{-ax}}\right)}{da} =$$

$$= \sum_{i=1}^{N} 2\left(y_i - \frac{1}{1+e^{-ax}}\right)\cdot$$

$$\frac{d\Sigma}{d\heartsuit} = \frac{d\Sigma}{d\diamondsuit}\frac{d\diamondsuit}{d\heartsuit}$$

$$\frac{d}{da}\left(y_i - (1+e^{-ax})^{-1}\right)$$

$$\frac{d}{dz}z^{-1} = \frac{d}{da}\,1+e^{-ax} = (1+e^{-ax})^{-2}(-xe^{-ax})\frac{d}{da}y_i - \frac{d}{da}(1+e^{-ax})^{-1}$$

$b^* = \hat{y} - a^* \hat{x}$

$$a^* = \frac{\sum_{i=1}^{N} (x_i - \hat{x})(y_i - \hat{y})}{\sum_{i=1}^{N} (x_i - \hat{x})^2}$$

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

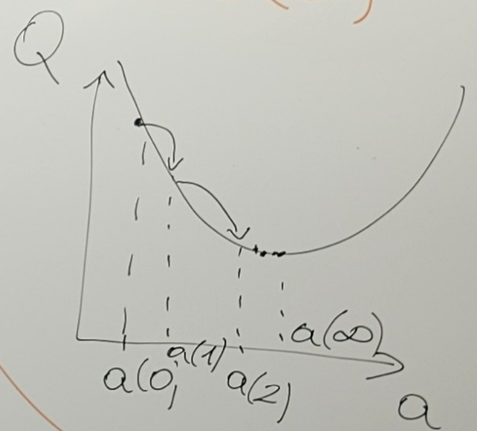
W domu

Implement. $N \frac{1}{N} \sum_{i=1}^{N} x_i$

$\tilde{\Theta} = \begin{bmatrix} a^{(1)} \\ a^{(2)} \end{bmatrix}$

W domu:

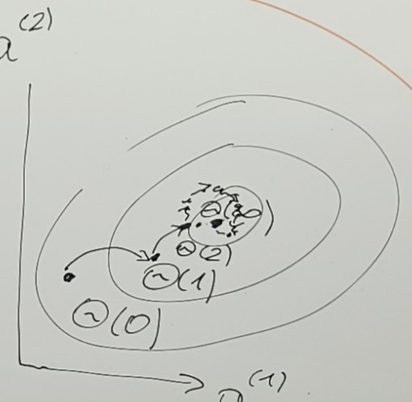
$Q(a) = e_k$



Centrowanie

$x \leftarrow x - \hat{x}$

$y \leftarrow y - \hat{y}$



$\bar{y} = ax$

$e_i = y_i - \bar{y}_i$

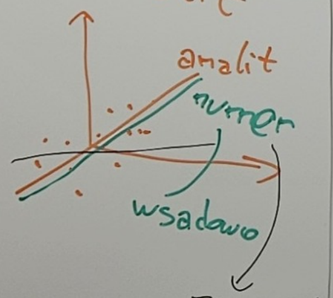
$Q(a) = \sum_{i=1}^{N} e_i^2$

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

$a^* = \dots$

Analit

rozw. analit



$a(0)$ - losowe

$a(k+1) = Alg.num.(a(k))$ dla $k \geq 0$

$a(k+1) = a(k) + \left.\frac{dQ}{da}\right|_{a=a(k)}$

$a(k+1) = a(k) + 2 \sum_{i=1}^{N} (y_i - a(k)x_i)(-x_i)$

Numer

← met. grad. prostego

$a \leftarrow a + \alpha \sum_{i=1}^{N} (y_i - ax_i)(-x_i)$

$a \leftarrow a + \alpha \frac{dQ}{da}$, $\alpha \in \mathbb{R}_+$