$X = [a, b, c]$ $e = [d, e, f]$

$X + e$

X

$X * e$

torch.pow$(X * 2, e)$

$[a^d, b^e, c^f]$

$$f : \mathbb{R}^m \longrightarrow \mathbb{R}$$

$$\nabla_x f = \begin{pmatrix} \partial f/\partial x_1 \\ \vdots \\ \partial f/\partial x_m \end{pmatrix}$$

$$H(f)_x = \left[\frac{\partial^2 f}{\partial x_i \partial x_j} \right]$$

$$\begin{bmatrix} \frac{\partial^2 f}{\partial x_1 \partial x_1} & \frac{\partial^2 f}{\partial x_2 \partial x_1} & \frac{\partial^2 f}{\partial x_3 \partial x_1} & \cdots \\ \left[\frac{\partial f}{\partial x_2}\right] & \cdots & \cdots & \cdots \end{bmatrix}$$

$$\nabla_x \left[\begin{pmatrix} \partial f/\partial x_1 \\ \partial f/\partial x_2 \\ \partial f/\partial x_3 \end{pmatrix} \cdot \begin{pmatrix} 1_2 \\ 1_3 \\ 1_8 \end{pmatrix} \right]$$

$$f : \mathbb{R}^n \longrightarrow \mathbb{R}$$

$\hat{y} = m \cdot x$ $\quad m = 1 \quad x = 1 \quad y = 2$

$loss = (mx - y)^2$

LOSS.BACKWARD

M.GRAD

$2(mx - y) \cdot x$

$2(1 \cdot 1 - 2) \cdot \underline{1}$

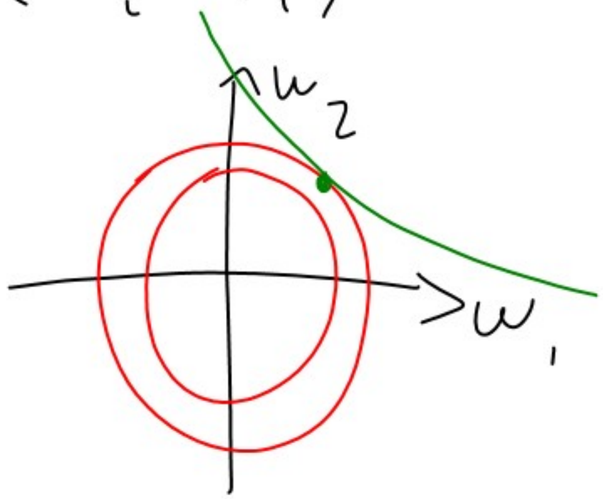
$$L = \sum_i \left(\hat{y}(x_i, w) - y_i\right)^2$$

$$\frac{\partial L}{\partial w} = 2 \sum_i \left(\hat{y}(x_i, w) - y_i\right) \cdot x_i$$

$$2 \begin{pmatrix} \hat{y}_1 - y_1 \\ \hat{y}_2 - y_2 \\ \vdots \\ \hat{y}_n - y_n \end{pmatrix} \cdot \begin{pmatrix} x_1 \\ x_2 \\ \vdots \\ x_n \end{pmatrix}$$

$$w \leftarrow w - \lambda \nabla_w \mathcal{L}_B$$

$$\sum_i (\hat{y}_i - y_i)^2$$



$$\sum_i |\hat{y}_i - y_i|$$