

Pzrialesy on ML YES - 2

$$f = ((\underset{1}{a} + \underset{5}{e}) \cdot (\underset{7}{b} - \underset{3}{d}))^2$$

$$e = \boxed{a + c} = 6$$
$$b - d = \boxed{g} = 4$$

$$h = \boxed{e \cdot g} = 24$$

$$\boxed{h^2}$$

$$\frac{\partial f}{\partial a} = \left(\frac{\partial f}{\partial h} \frac{\partial h}{\partial e} \frac{\partial e}{\partial a} \right) +$$
$$+ \cancel{\frac{\partial f}{\partial h} \frac{\partial h}{\partial g} \frac{\partial g}{\partial a}} = 0$$

$$\frac{\partial f}{\partial h} = 2h \quad "48$$

$$\frac{\partial h}{\partial e} = g \quad "4$$

$$\frac{\partial e}{\partial a} = 1$$

$$\frac{\partial f}{\partial a} = 192$$

Выводы:

①

Если есть график
всплескений, то легко
можно посчитать

$$\frac{P_f}{P_i}$$

по любой начальной
этапу графа

②

Рассчитывать производо-
ние регулируемых всплескений
— сложно

③

Можно считать

$$\frac{P_f}{P_i}$$

$$\frac{P_f}{P_x}, \dots$$

④

Чтобы посчитать
хорошо (но не идеально) можно

$$\frac{P_f}{P_i}$$

$$f$$

$$\hat{y} = \mu = \theta^T x$$

$\theta, x - \text{Векторы} - c = 0 \text{ для } \hat{y}$

$$\theta = \begin{bmatrix} \cdot \\ \cdot \\ \cdot \end{bmatrix} \quad x = \begin{bmatrix} \cdot \\ \cdot \\ \cdot \end{bmatrix} \quad \theta^T x$$

$$\frac{\partial (\theta^T x)}{\partial \theta} = \dots = x$$

$$\mu = I(\theta^T x)$$

$$J = \frac{1}{N} \sum_{i=1}^N (\mu_i - y_i)^2$$

A diagram showing a curved path from point x to point z through an intermediate point θ . The path is highlighted in cyan. The angle between the initial direction x and the final direction z is labeled θ .

$$x \boxed{\theta^\circ x} = z$$

$$\frac{\partial L}{\partial \theta} =$$

A diagram showing a straight path from point x to point z through an intermediate point ϵ . The path is highlighted in cyan.

$$x \boxed{E(\epsilon)} = z$$

$$\frac{\partial L}{\partial d} = 0$$

A diagram showing a straight path from point x to point z through an intermediate point $\mu - y$. The path is highlighted in cyan.

$$x \boxed{\mu - y} = z$$

$$\frac{\partial L}{\partial \mu} = 0$$

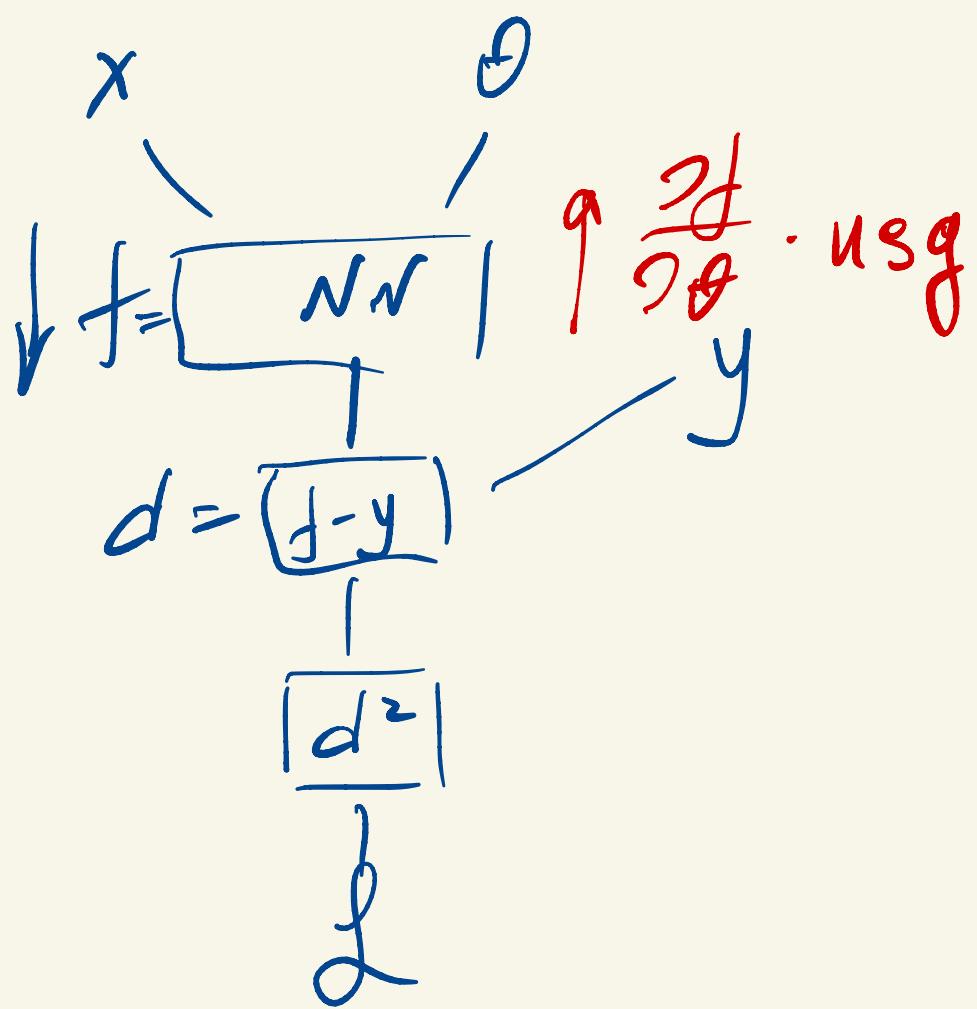
A diagram showing a straight path from point x to point z through an intermediate point $\sqrt{d^2}$. The path is highlighted in cyan.

$$x \boxed{\sqrt{d^2}} = z$$

$$\frac{\partial L}{\partial d} = 0$$

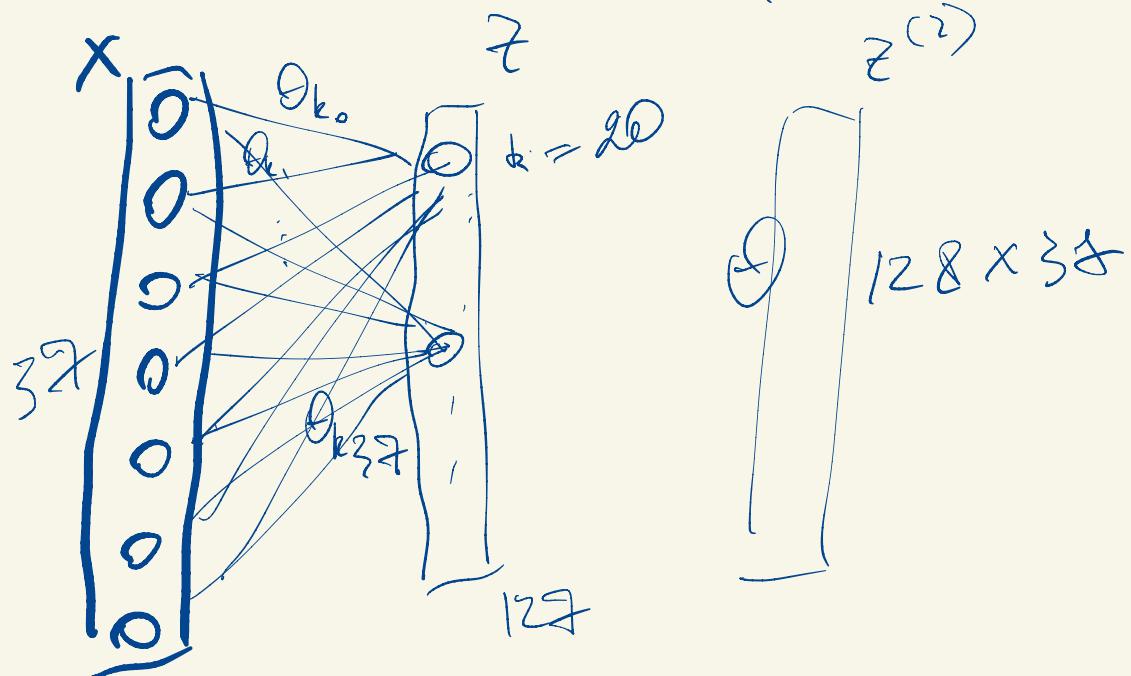
backward

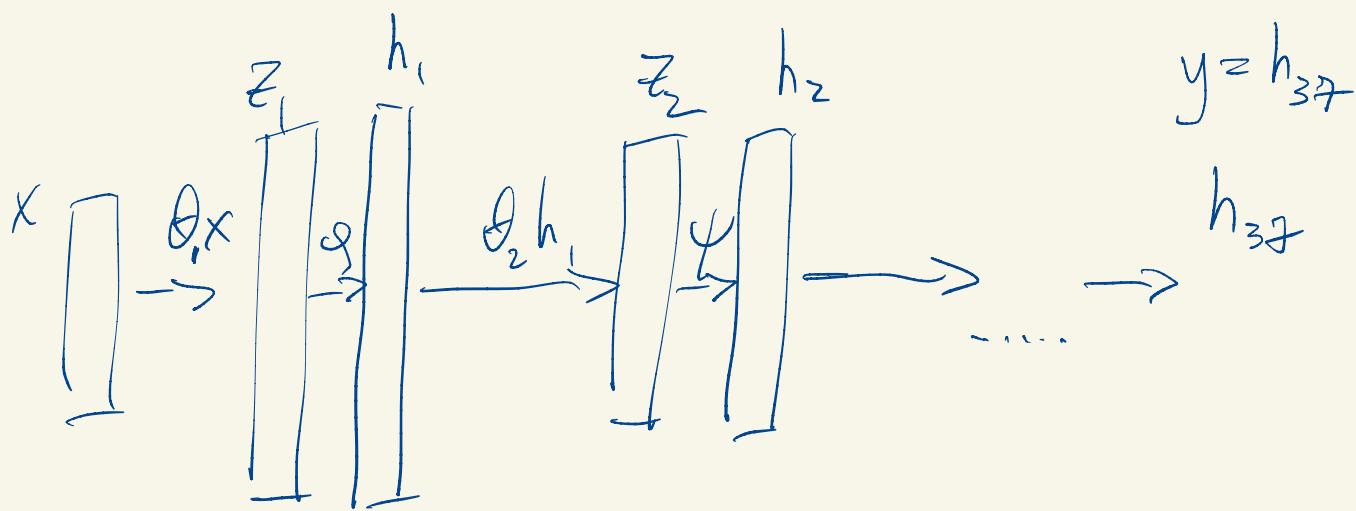
forward



$$z = \theta^T x$$

$$z_k = \sum_i \theta_{k,i} x_i$$





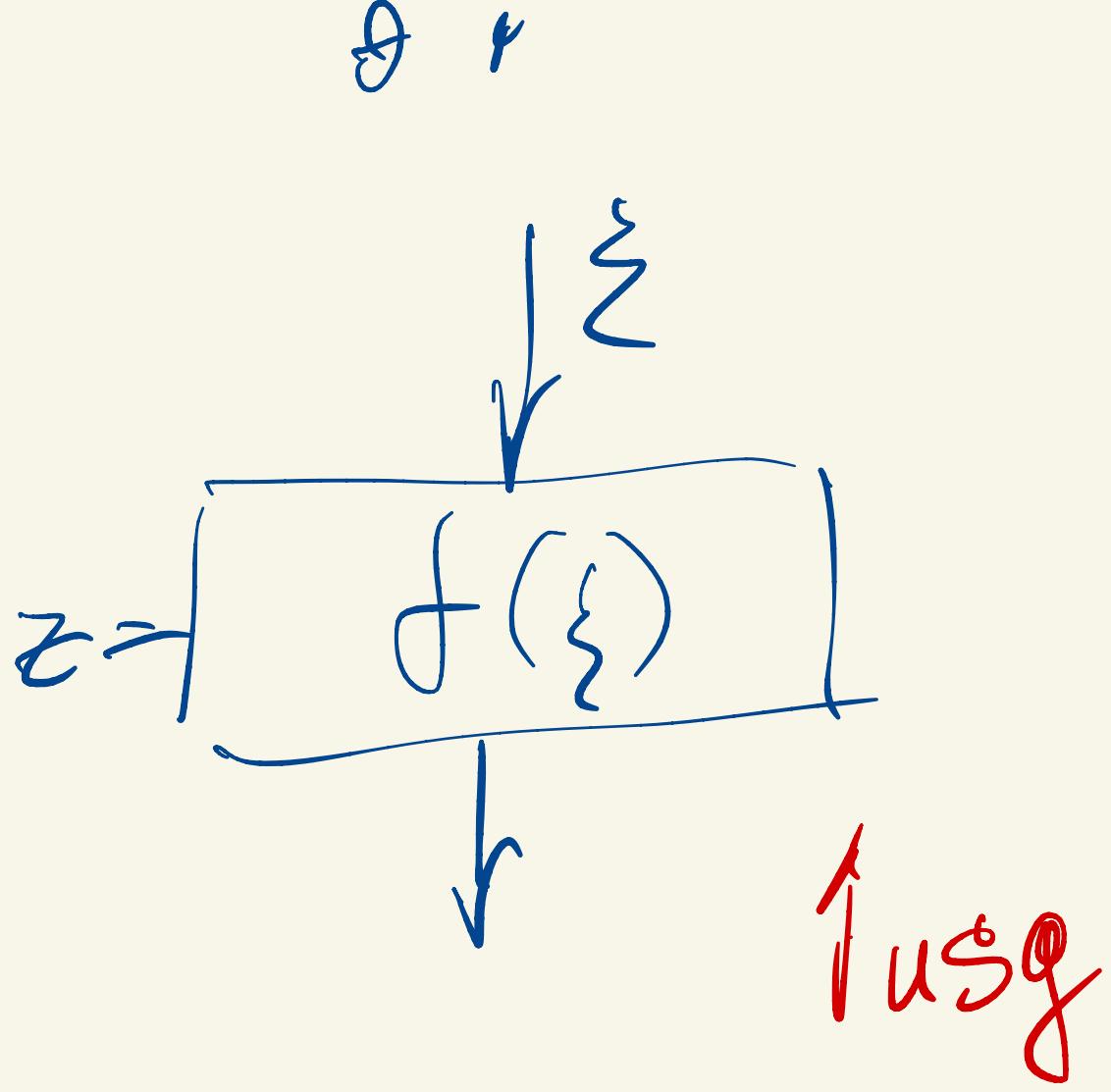
$$y = \psi(\dots \varphi(\theta_3 \varphi(\theta_2 \varphi(\theta_1 x))))$$

$$y = kx + b \quad \theta = \begin{pmatrix} \theta_1 \\ \theta_2 \\ \theta_3 \end{pmatrix} \quad (28 \times 37)$$

~~$\mathcal{J} = \sum (y - y_t)^2 = \sum_{i=1}^N (\text{NN}(x_i) - y_i)^2$~~

$\mathcal{J} = \sum (y - y_t)^2 = \sum_{i=1}^N (\text{NN}(x_i) - y_i)^2$

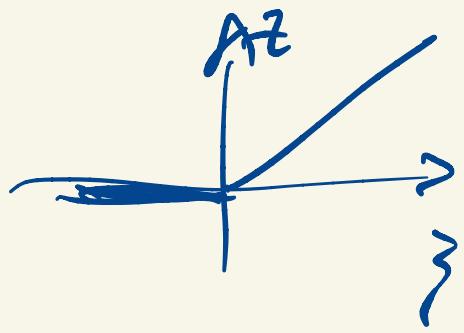
$\theta_1, \theta_2, \theta_3$



$$\frac{\partial \varphi}{\partial \zeta} = usg \cdot \frac{\partial z}{\partial \zeta}$$

φ
 z

$$z = f(\xi) = e^\xi$$



$$\frac{\partial z}{\partial \xi} = e^\xi$$

$$z = f(\xi) = \text{ReLU}(\xi)$$

$$\frac{\partial z}{\partial \xi} = \begin{cases} 0, & \xi < 0 \\ 1, & \xi \geq 0 \end{cases}$$