PARTIAL DERIVATIVES

1. MEANING
2. HOW TO CALCULATE PARTIAL DERIVATIVES
3. FIRST PRINCIPLE FORMULA
4. RELATION WITH RESPECT TO DEEP LEARNING

$$z = f(x,y) = x^2 + y^2$$

$$\frac{\partial f}{\partial x} = \frac{\text{change in } f}{\text{small change in } x} \quad \text{keeping } y \text{ constant}$$

$$\frac{\partial f}{\partial y} = \frac{\text{change in } f}{\text{small change in } y} \quad \text{keeping } x \text{ constant}$$

$$\frac{\partial f}{\partial x} = \frac{\partial (x^2 + k)}{\partial x} = 2x + 0 = 2x$$

$$\frac{\partial f}{\partial y} = \frac{\partial (c + y^2)}{\partial y} = 0 + 2y = 2y$$

$$\frac{\partial f}{\partial x} = \lim_{\Delta x \to 0} \frac{f(x+\Delta x, y) - f(x,y)}{\Delta x}$$

$$\frac{\partial f}{\partial y} = \lim_{\Delta y \to 0} \frac{f(x, y+\Delta y) - f(x,y)}{\Delta y}$$

loss f^4 $= f(W, b)$ $f(W_1, \dots W_n, b_1, \dots b_n)$