Sep 26. 2024

Chain Rule

$f(x, y, z) = (x+y) \cdot z$

e.g. $x = -2,\ y = 5,\ z = -4$

$f(-2, 5, -4) = (-2+5) \cdot (-4) = -12$

let $q = x+y$, $\frac{\partial q}{\partial x} = 1$, $\frac{\partial q}{\partial y} = 1$

$f = q \cdot z$ $\frac{\partial f}{\partial q} = z$ $\frac{\partial f}{\partial z} = q$

$$\frac{\partial f}{\partial x} = \frac{\partial f}{\partial q} \cdot \frac{\partial q}{\partial x} + \frac{\partial f}{\partial z} \cdot \frac{\partial z}{\partial x} = z \cdot 1 + q \cdot 0 = -4$$

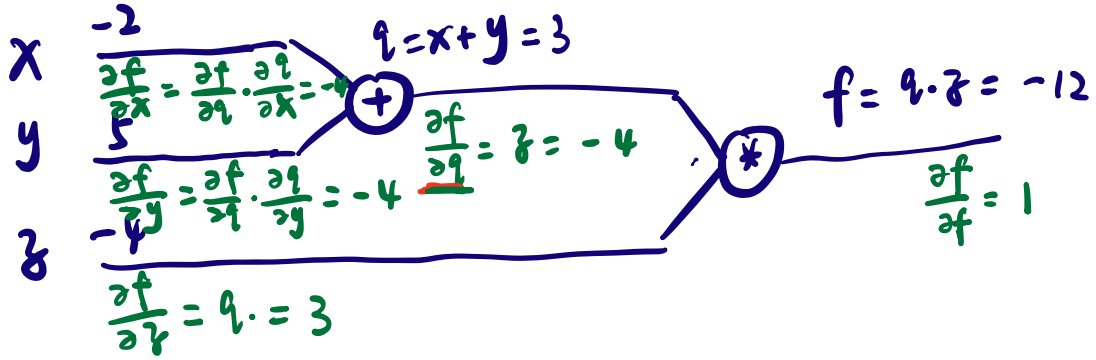
$$\frac{\partial f}{\partial y} = \frac{\partial f}{\partial q} \cdot \frac{\partial q}{\partial x} + \frac{\partial f}{\partial z} \cdot \frac{\partial z}{\partial y} = z \cdot 1 + 0 = -4$$

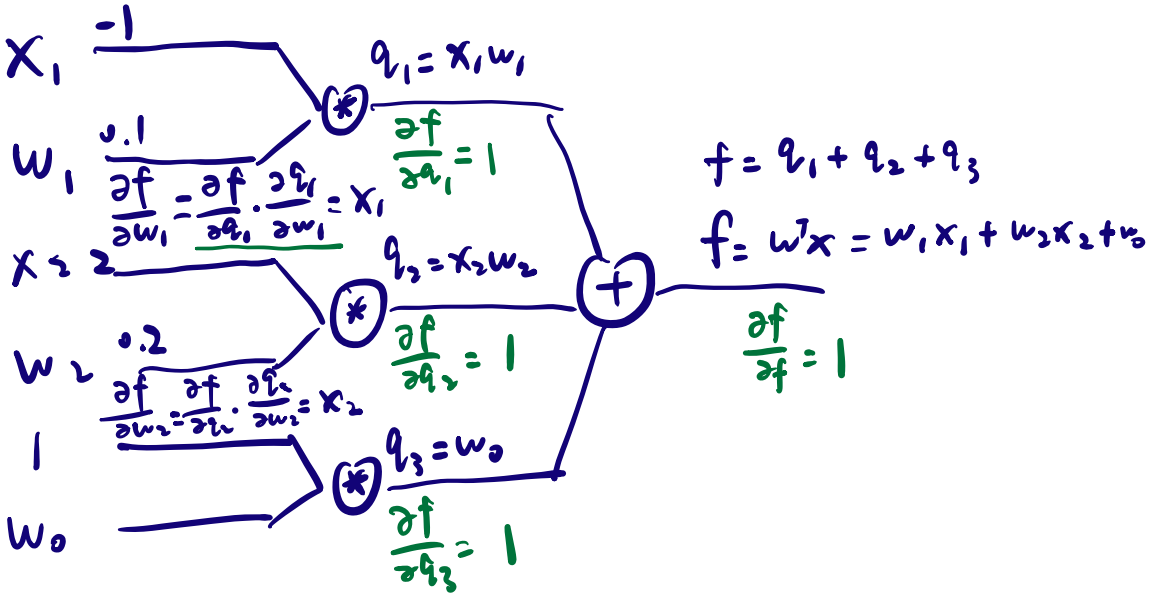
$$\frac{\partial f}{\partial z} = q = x+y = 3$$

Neural Networks

backpropogation: forward pass
backward pass

$J(w) = f(w, x)$





$$w_1 = 0.1 - \eta \cdot x_1 = 0.1 - \eta \cdot (-1) = 0.1 + \eta$$

$$w_2 = 0.2 - \eta \cdot x_2 = 0.2 - 2\eta$$

e.g. set $\eta = 0.1$