$$J(0) = \frac{1}{2m} \sum_{i=1}^{m} (h(0) - y)^{2} = \frac{1}{2m} \sum_{i=1}^{m} (\bar{0}x - y)^{2}$$

In Matrix Notation.

$$J(0) = \frac{1}{2} (x0-y)^{T} (x0-y)$$

$$\mathcal{J}(0) = \frac{1}{2} \left(O^{\dagger} \times \mathcal{I} - \mathcal{Y}^{\dagger} \right) \left(\times O - \mathcal{Y} \right)$$

$$= \frac{1}{2} \left(\partial^{T} x^{T} x \partial - \partial^{T} x^{T} y - y^{T} x \partial + y^{T} y \right)$$

The goal is to find theta (0) Values where loss function (Convex function) is zero (Minimum) &

To fix Gradient tells us the direction of function

.. We want
$$\nabla J(0) = 0 \longrightarrow global Minima$$

$$\frac{dJ(0)}{d0} = \frac{1}{2} \frac{d}{d0} \left(\frac{\partial^T x^T x \partial - \partial^T x^T y}{\partial y^T \partial y^T \partial y} - \frac{y^T x \partial y}{\partial y^T \partial y} \right)$$

$$= \frac{1}{2} (2(x^{T}x0) - x^{T}y - y^{T}x + 0)$$

$$-\frac{1}{2}(2(x^{T}x0-2x^{T}y)=0$$

$$\Rightarrow x^{T}x\theta - x^{T}y = 0 \Rightarrow x^{T}x\theta = x^{T}y$$

0 = xty

XXT moisseyer reposit myst been) XXT is Square matrix -> ____ Square matrix

Square matrix Matrin Notation p. Tx (Txx) = *0 ¿. Optmised O values are (xxT) · xToy 1 (BIX XB - DIX 14 - 4XB + 414) he goal is to find the (0) values where loss further (comes function) is zero (stirtment of to the Gradient tells us the direction of function O It Gradient is so It is going upward to I Gradent is = 0 (Global Minima) I Gradient is to (Storm Joing downward we want VI(0) = 0 -> global ruin ma 100 1 4 (07/10 -07/9 - 9/10 + 9/9 (0+x,h-h,x-(B)xx)8) == 0 = (3,xE - Bx,x)E) - 5. MAB-KA-O- MEB- RA