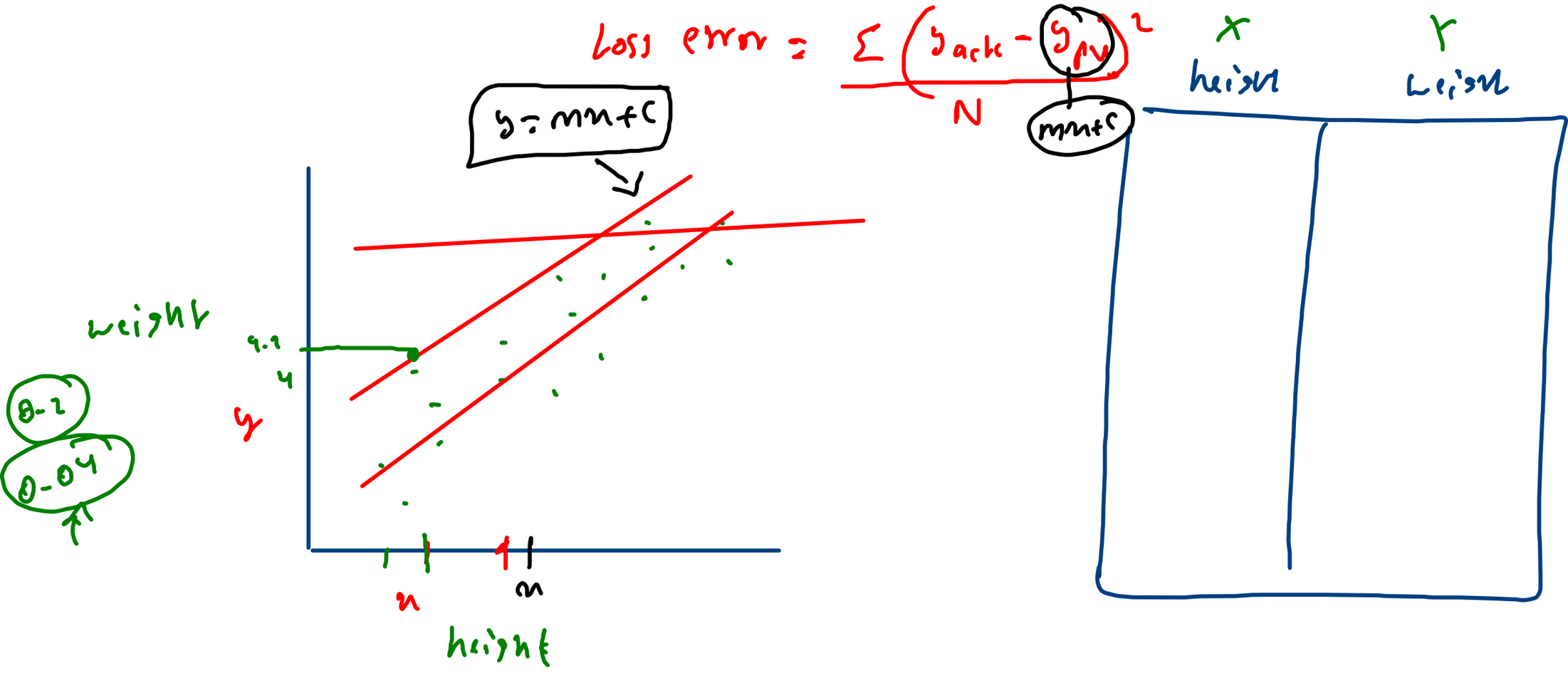
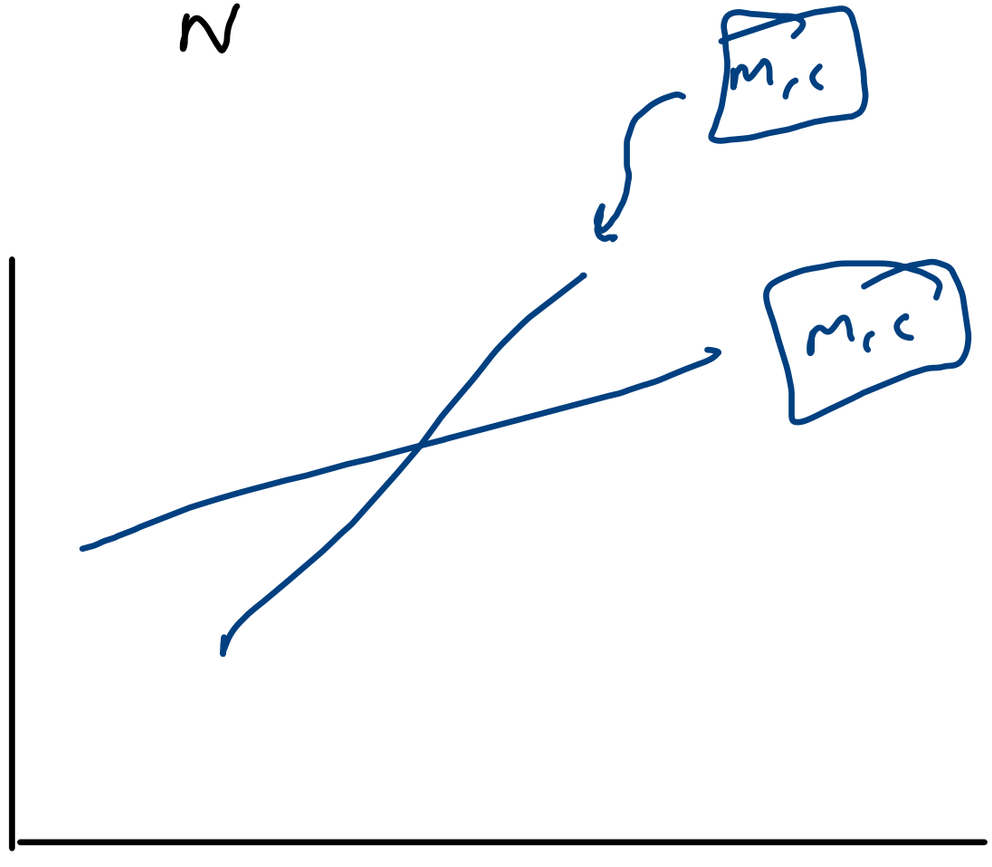

Loss error = $\frac{\sum (y_{actl} - y_{pred})^2}{N}$
y_{pred} = mx+c
y = mx+c
weight
θ-1
θ-0
y
x
height
x
height
n
m
height

Loss function $= \frac{\sum \left(y - (mx+c) \right)^2}{N}$

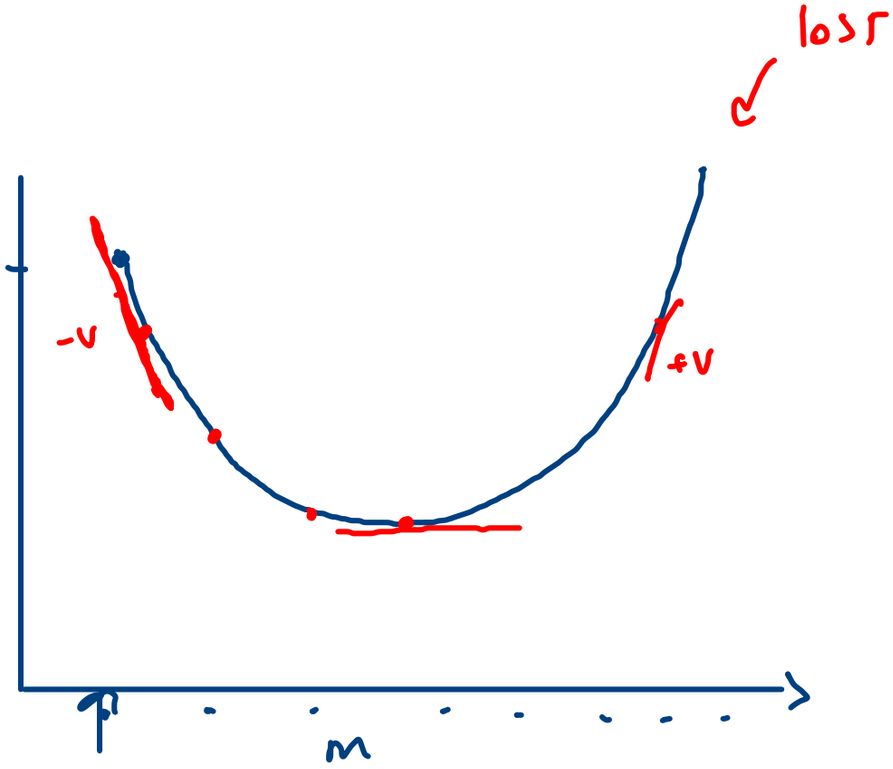
$mx+c$

m, c



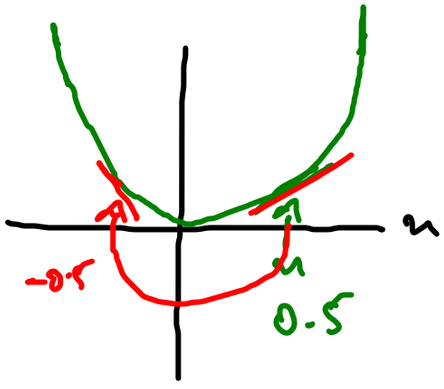
Gradient

Descent



$$\frac{d\ f(m)}{d\ m} = 0$$

$$\text{slope} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{dy}{dx}$$

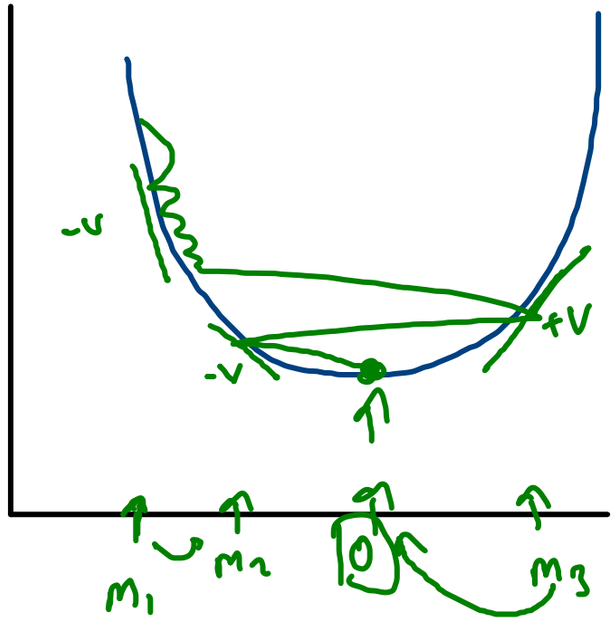


$y = x^2$

$\frac{dy}{dx} = 2x$

$-0.5 - (-1) =$

$-0.5 + 1 = 0.5$



$m_{new} = m_{old} - \lambda \frac{d\,f(m)}{dm}$ ← slope

learning rate

$m_1 = -(-v)$

$m_2 = m_1 + v$

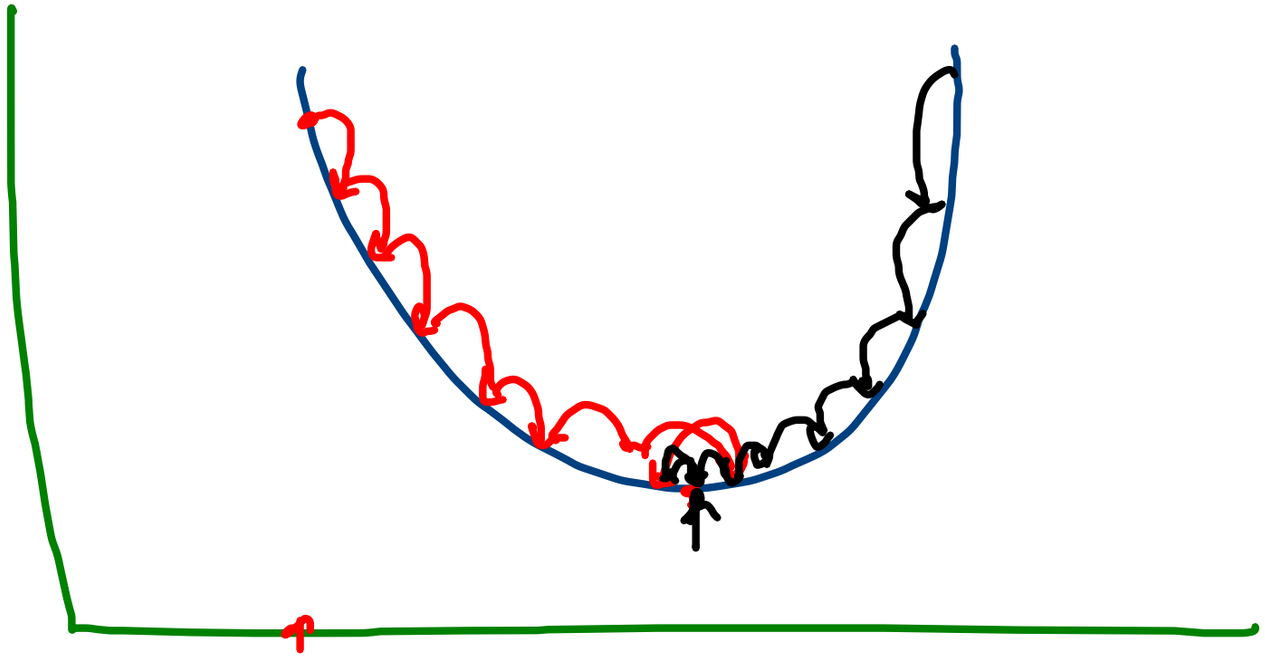
$m_3 = m_2 - (-v)$

$= m_2 + v$

$m_4 = m_3 - (+v)$

$= m_3 - v$

$\lambda = f(i)$



$$\frac{dL(m)}{dm} = \frac{d}{dm}\left(\frac{1}{N}\sum\left(y-(mx+c)\right)^2\right)$$

$$= \frac{1}{N}\,2\,(y-[mx+c])\,x(-x)$$

$$= -\frac{2}{N}\,x\,(y-mx-c)$$

like equation → $y = mx + c$

3D

$$z = m_1 x + m_2 y + c$$

x	y
x_1	y_1
x_2	y_2

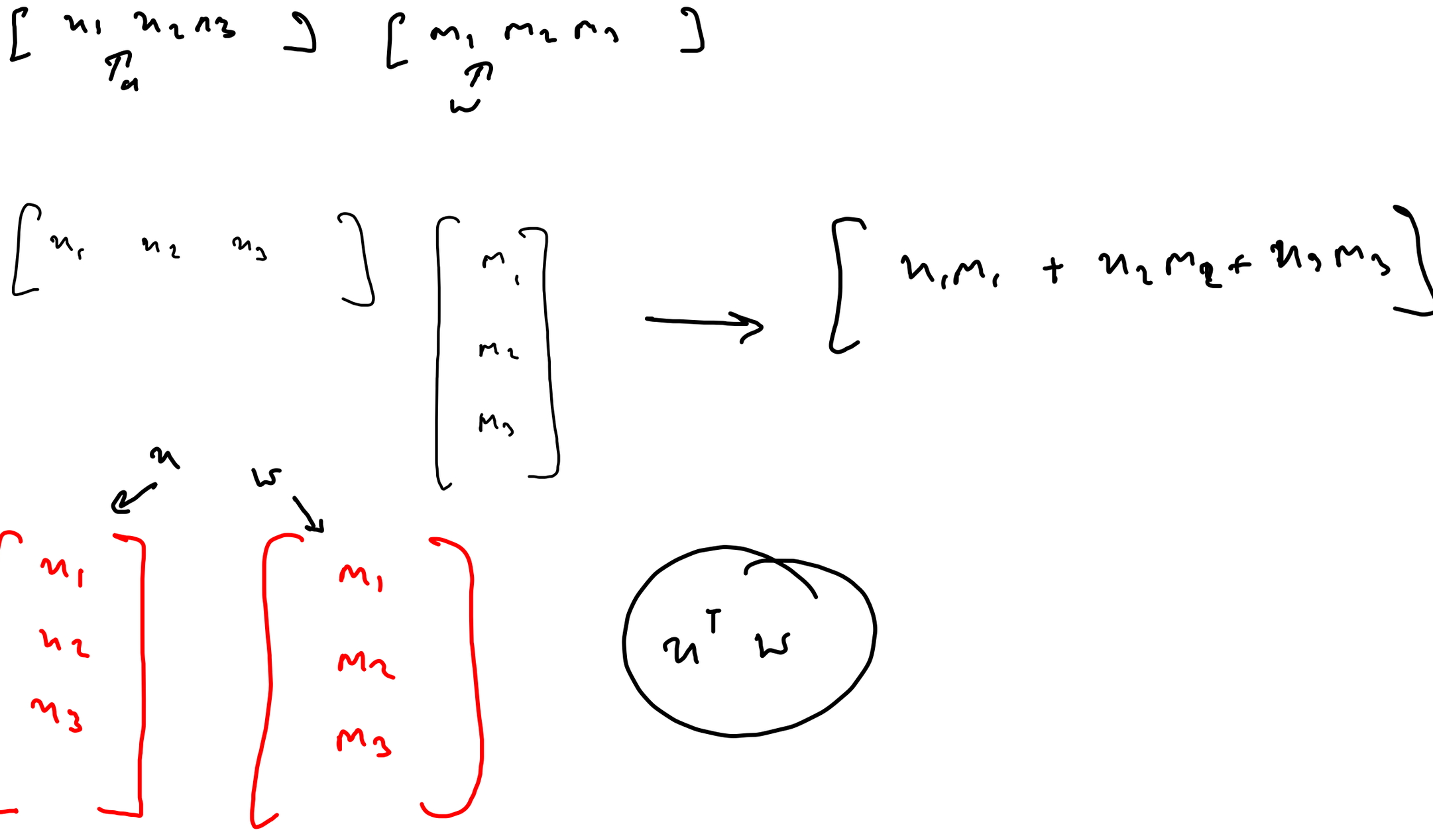
slopes $[m_1, m_2, m_3 \ldots m_d]$

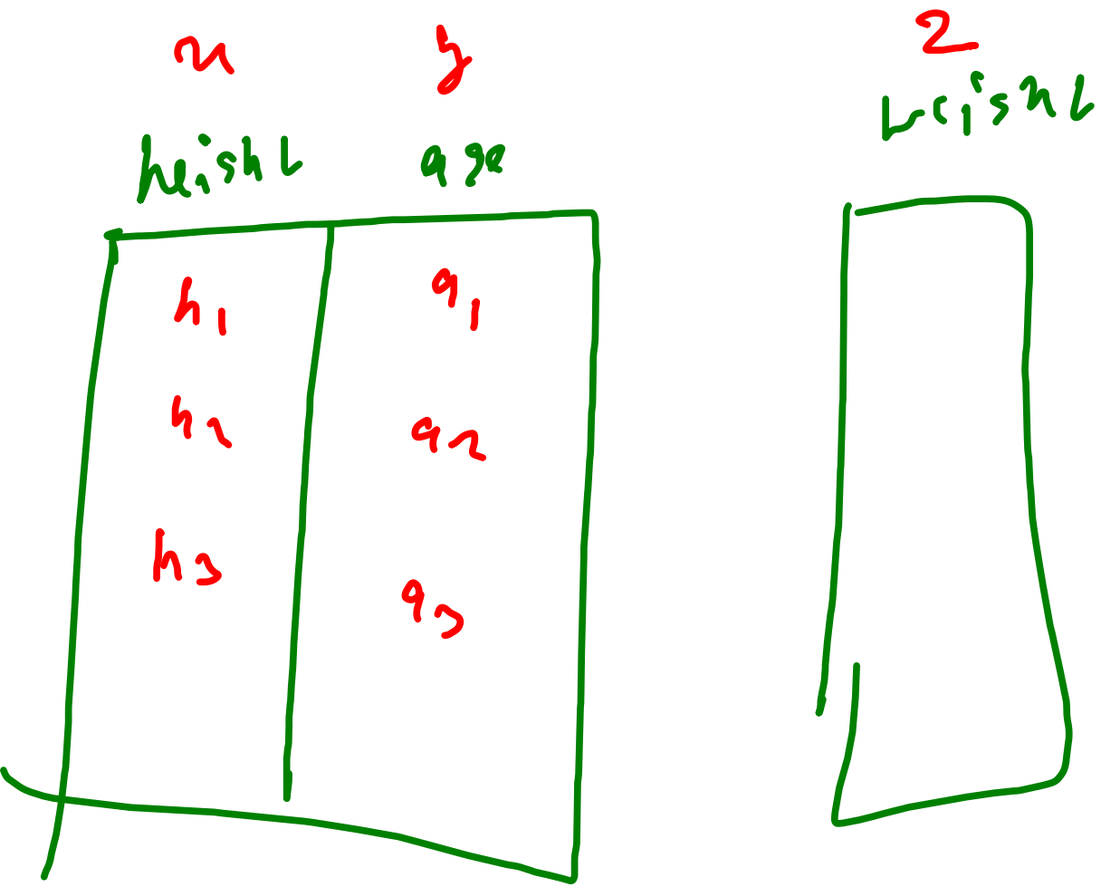
like equation → $y = x_1 m_1 + c_1 + x_2 m_2 + c_2$

$$y = x_1 m_1 + x_2 m_2 + c$$
$$x_3 m_3 + \ldots x_d m_d$$

d

x_1	x_2	x_3	y
5	8	7	=


u
w
u
w
u^T w


x
height
y
age
h_1
h_2
h_3
a_1
a_2
a_3

2
weight

x_1	x_2	x_3
1	2	3
2	1	4
7	8	3
4	2	1

y
12.4
13.3
42.5

$y = 3x_1 + 2x_2 + 0x_3 + 5$

$3\times1 + 2\times2 + 0 + 5 = 3+4+5$

$3\times2 + 2\times1 + 0 + 5 = 6+2+5 = 13$

$3\times7 + 2\times8 + 0 + 5 = 42$

$\text{loss} = \min\left(\sum y_{act} - y_{pred}\right)$

$+ \lambda \left(w\right)^2$

regularization

q

regularizer, L2 norm, Ridge

$y = m_1 x_1 + m_2 x_2 + m_3 x_3 + c$

$w \to [m_1 m_2 \ldots]$

3.2 2.1 0.3 5.2