

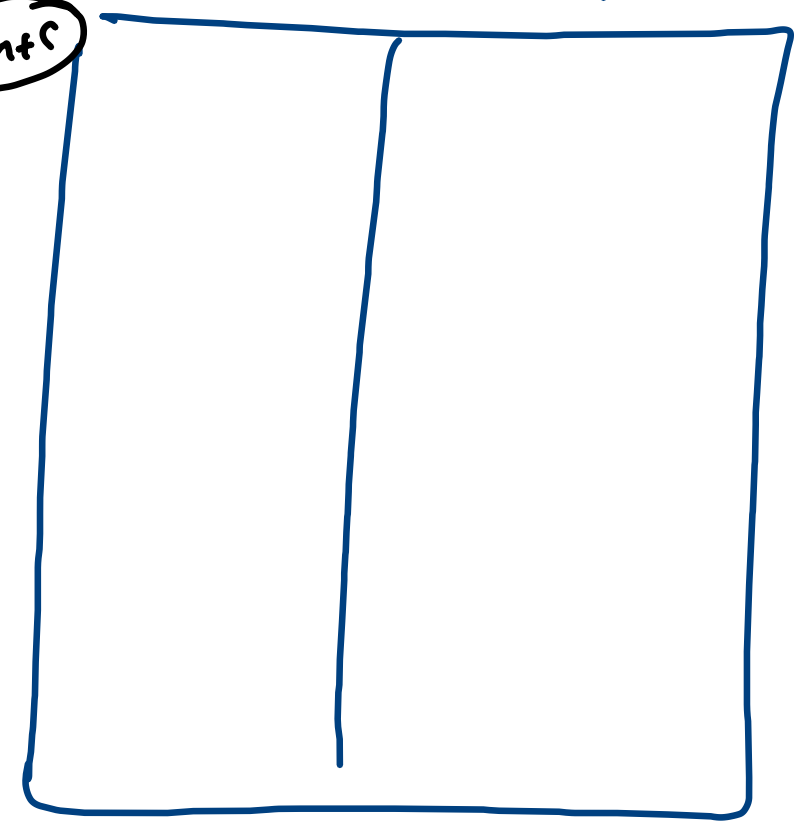
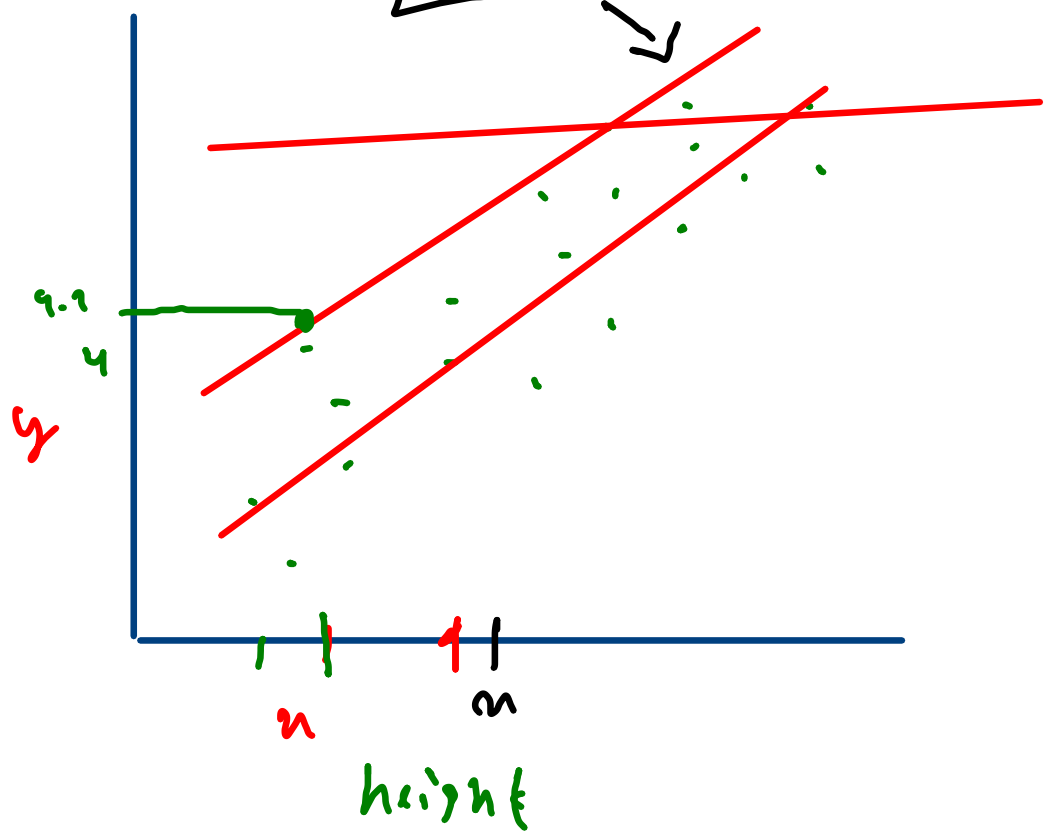
$$\text{loss error} = \frac{\sum (y_{\text{ack}} - y_{\text{pv}})^2}{N}$$

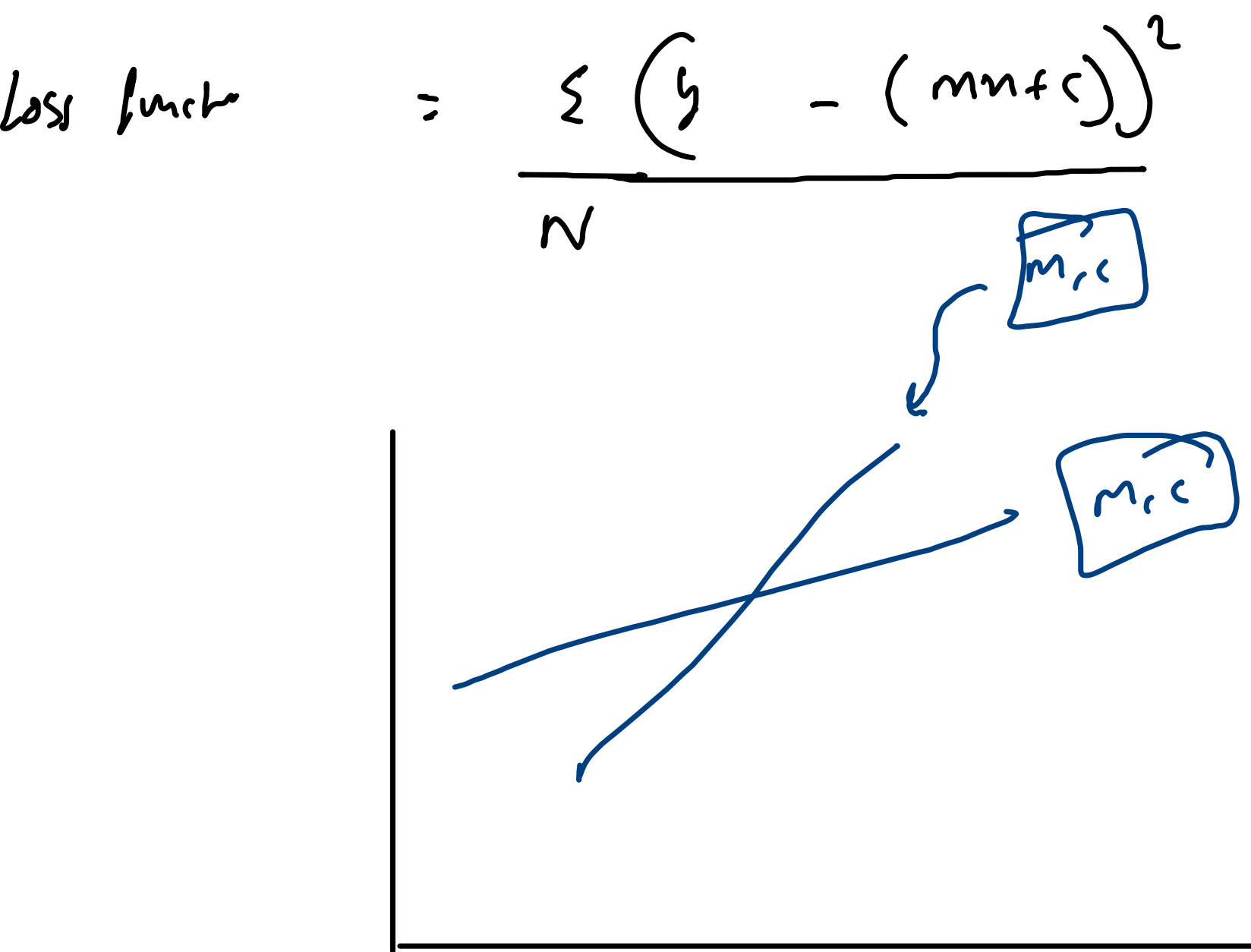
$$y = mx + c$$

x
height

y
weight

weight
 $\theta = 2$
 $\theta = 0.4$





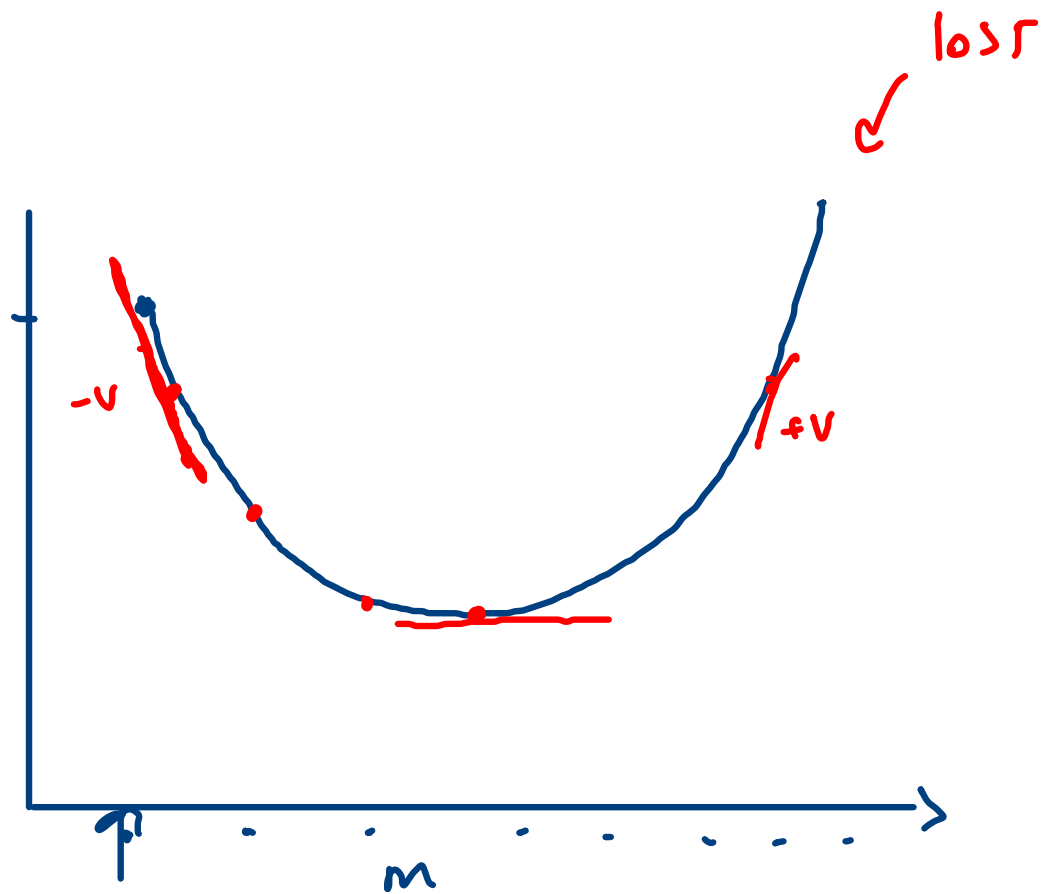
$mn+c$

m, c

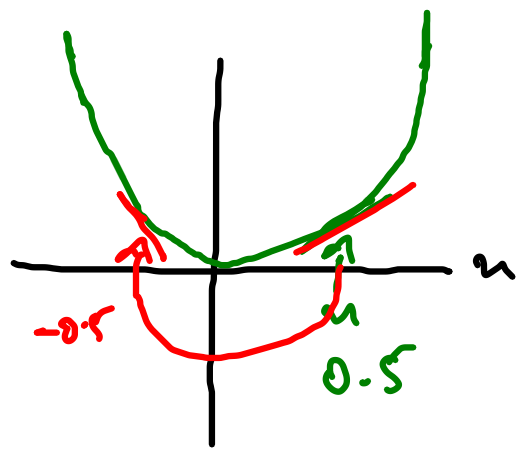
Gradient
Descent

$f(m)$

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



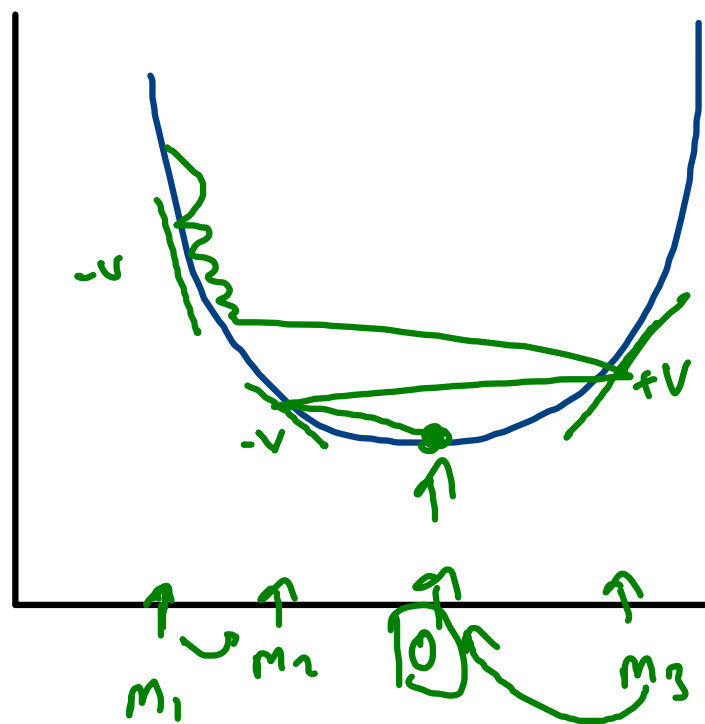
$$\text{slope} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{dy}{dx}$$



$$y = x^2$$

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

$$\begin{aligned} -0.5 - (-1) &= \\ -0.5 + 1 &= 0.5 \end{aligned}$$



$$M_{new} = M_{old} - \lambda \frac{d f(m)}{d m} \quad \leftarrow \text{slope}$$

learning rate

$$M_1 = (-v)$$

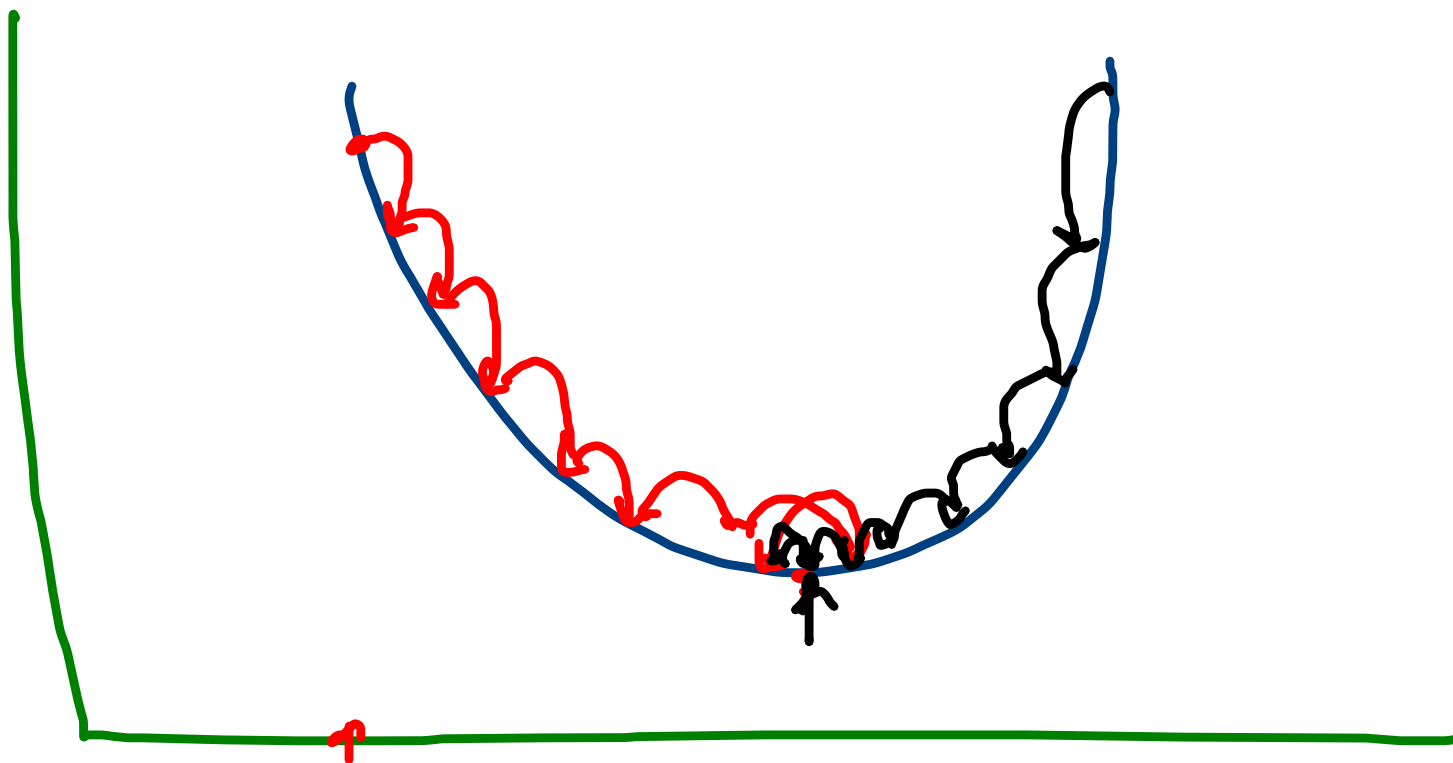
$$M_2 = M_1 + v$$

$$\begin{aligned} M_3 &= M_2 - (-v) \\ &= M_2 + v \end{aligned}$$

$$\begin{aligned} M_4 &= M_3 - (+v) \\ &= M_3 - v \end{aligned}$$

$$\lambda = f(i)$$

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$$\frac{dI(m)}{dn} = \frac{d}{dn} \left(\frac{1}{n} \sum \left(y - (mn+c) \right)^2 \right)$$

$$= \frac{1}{n} 2 \left(y - [mn+c] \right) \times (-n)$$

$$= -\frac{2}{n} n \left(y - mn - c \right)$$

lin equation $\rightarrow y = mx + c$

x	y
x_1	y_1
x_2	y_2

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

lin equation $\rightarrow y = x_1 m_1 + c_1 + x_2 m_2 + c_2$

x_1	x_2	x_3	y
5	8	7	11

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

$$\begin{bmatrix} u_1 & u_2 & u_3 \\ \mathbf{u} \end{bmatrix} \quad \begin{bmatrix} m_1 & m_2 & m_3 \\ \mathbf{m} \end{bmatrix}$$

$$\begin{bmatrix} u_1 & u_2 & u_3 \end{bmatrix} \begin{bmatrix} m_1 \\ m_2 \\ m_3 \end{bmatrix} \rightarrow \begin{bmatrix} u_1 m_1 + u_2 m_2 + u_3 m_3 \end{bmatrix}$$

$$\begin{matrix} \swarrow \mathbf{u} \\ \begin{bmatrix} u_1 \\ u_2 \\ u_3 \end{bmatrix} \end{matrix} \quad \begin{matrix} \swarrow \mathbf{m} \\ \begin{bmatrix} m_1 \\ m_2 \\ m_3 \end{bmatrix} \end{matrix}$$

$$\mathbf{u}^T \mathbf{m}$$

loss function

$$\frac{d f(m)}{dm}$$

