

$$\text{error} = \frac{1}{n} \sum_{i=1}^n (y_i - y_p)$$

0
MSE

with fun

minima

$$\frac{1}{n} \sum_{i=1}^n (y_i - y_p)^2$$

$$y_p = \max_j x_j + c$$

$$J = \frac{1}{n} \sum_{i=1}^n (y_i - y_p)^2 = \frac{1}{n} \sum_{i=1}^n (y_i - (mx_i + c))^2$$

$$\textcircled{1} \sum_{i=1}^n (y_i - \boxed{mx_i} - c)^2$$

P.D w.r.t. m

P.D w.r.t. c

P.D w.r.t. m

$$2 \sqrt{n} \rightarrow 1 \quad 2$$

$$\frac{\partial J}{\partial m} = \frac{2}{n} \sum_{i=1}^n (y_i - mx_i - c) \times (-x_i)$$

$$\partial n : 1$$

$$= - \frac{2}{n} \sum_{i=1}^n (y_i - mx_i - c) x_i$$

$$= - \underline{\underline{2}}$$

$$J = \frac{1}{n} \sum_{i=1}^n (y_i - mx_i - c)^2$$



$$\frac{\partial J}{\partial c} = \frac{2}{n} \sum_{i=1}^n (y_i - mx_i - c) \times (-1)$$

$$= -\frac{2}{n} \sum_{i=1}^n (y_i - mx_i - c)$$

$$y = mx + c$$

0.001 0.00001

$$m_{\text{new}} = m_{\text{old}} - \frac{2}{n} \sum_{i=1}^n (y_i - mx_i - c)(x_i)$$

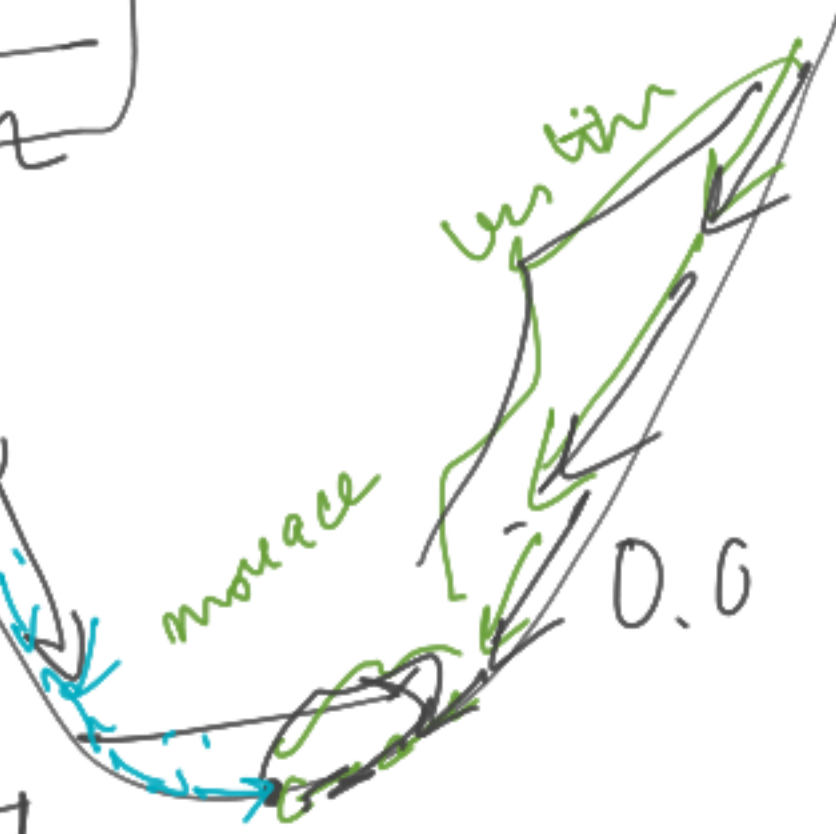
$$c_{\text{new}} = c_{\text{old}} - \frac{2}{n} \sum_{i=1}^n (y_i - mx_i - c)$$

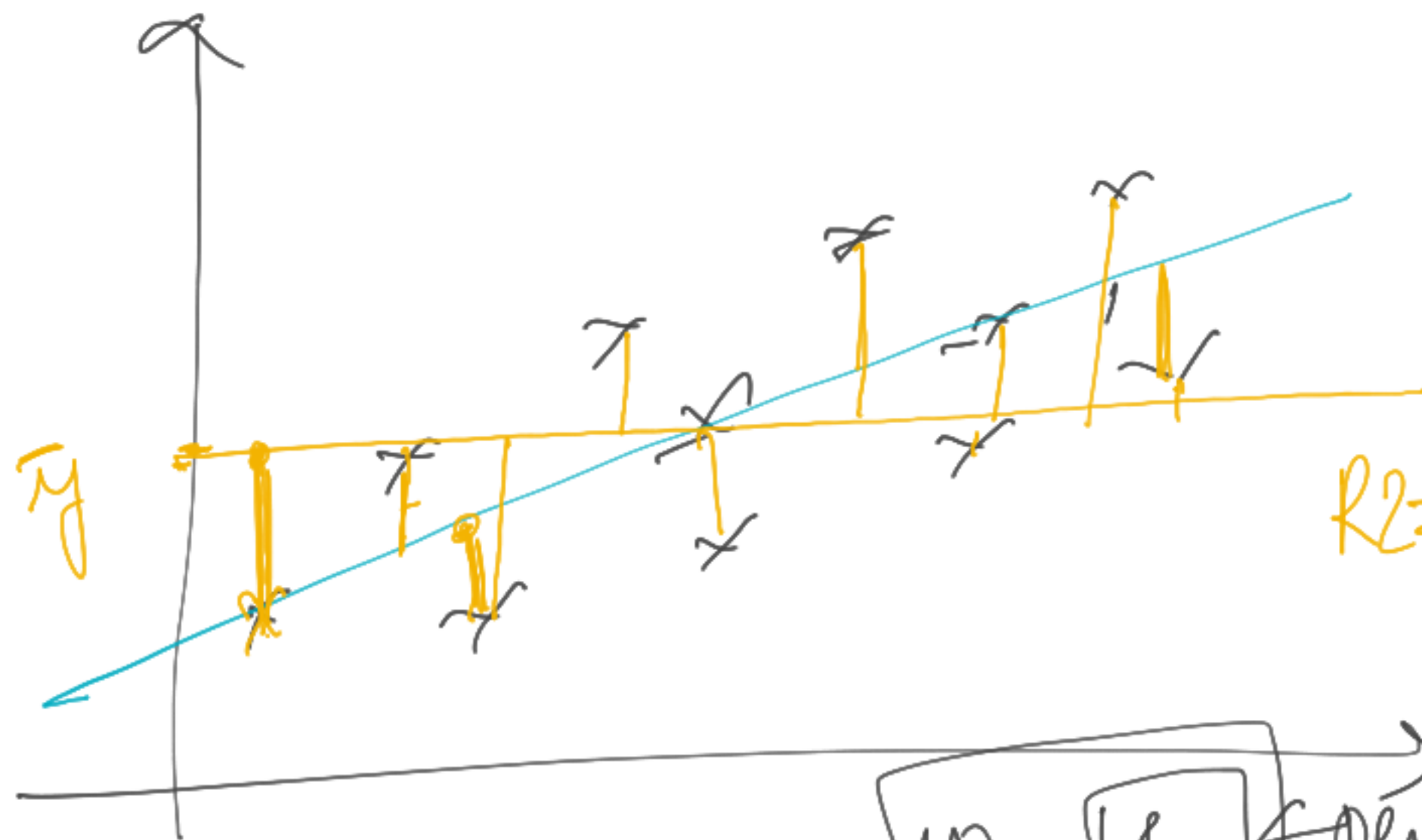
$$y = \boxed{m}x + \boxed{c} \quad 0.01$$

$$m_{\text{new}} = m + \alpha \frac{\partial J}{\partial m}$$

$$c_{\text{new}} = c + \alpha \frac{\partial J}{\partial c}$$

$\alpha \rightarrow$ learning rate
 \Rightarrow hyperparameter $\boxed{0.01}$





R^2 score

Residual SE

$$R^2 = 1 - \frac{SSE}{TSS} = 0$$

$10 - 11$ ← perfect

$y_i - \bar{y}$

Error due regression

SSE : (Sum of squared error)

$$= \sum_{i=1}^n (y_i - \hat{y})^2$$

TSS (Total sum of squares) =
$$\sqrt{\sum_{i=1}^n (y_i - \bar{y})^2}$$

$$R^2 = 1 -$$

$$\frac{SSE}{TSS}$$

SSE small

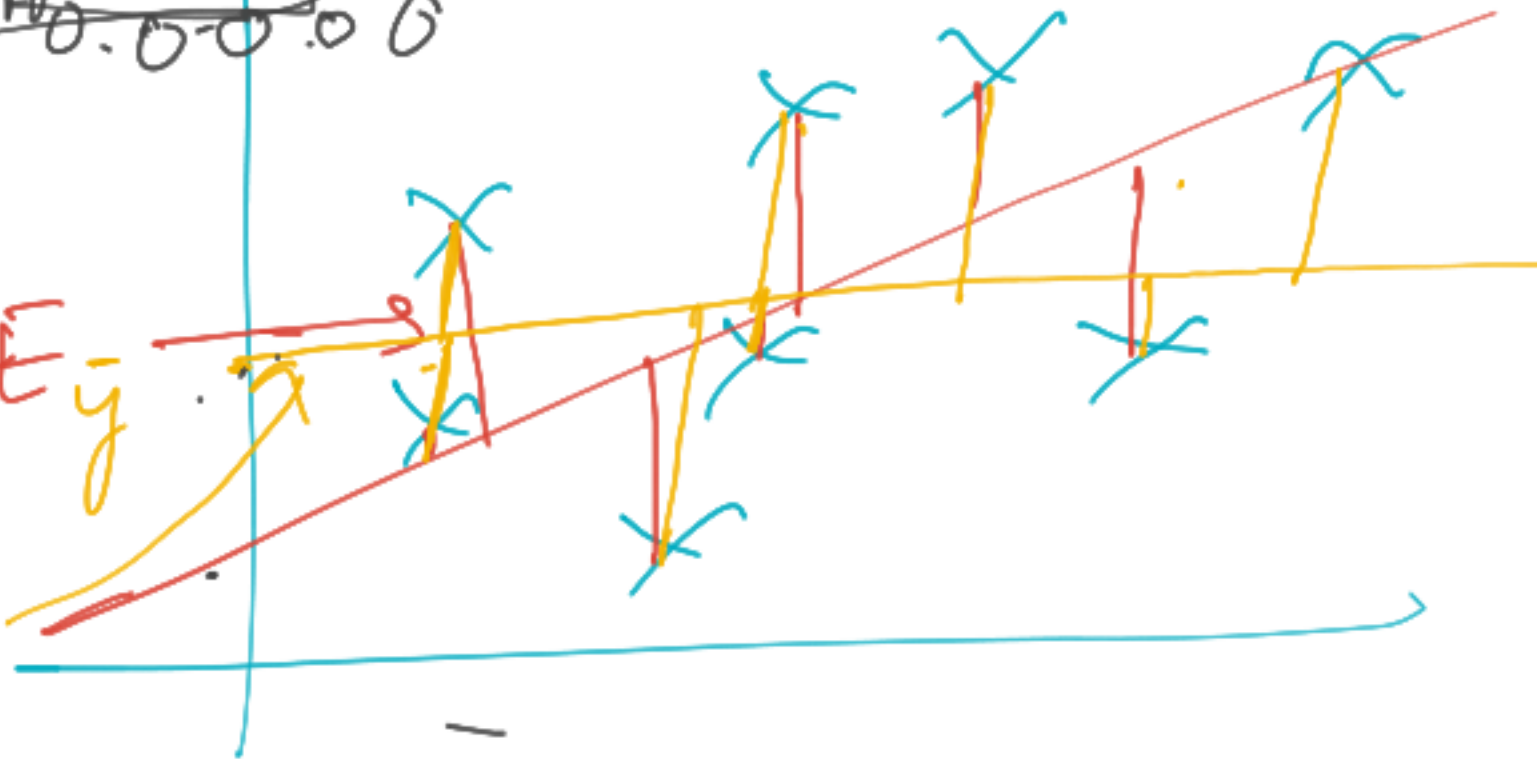
TSS large

S_n

$$0.000000$$

SSE_y

TSS



$$SSE > TSS$$

$$SSE < TSS$$

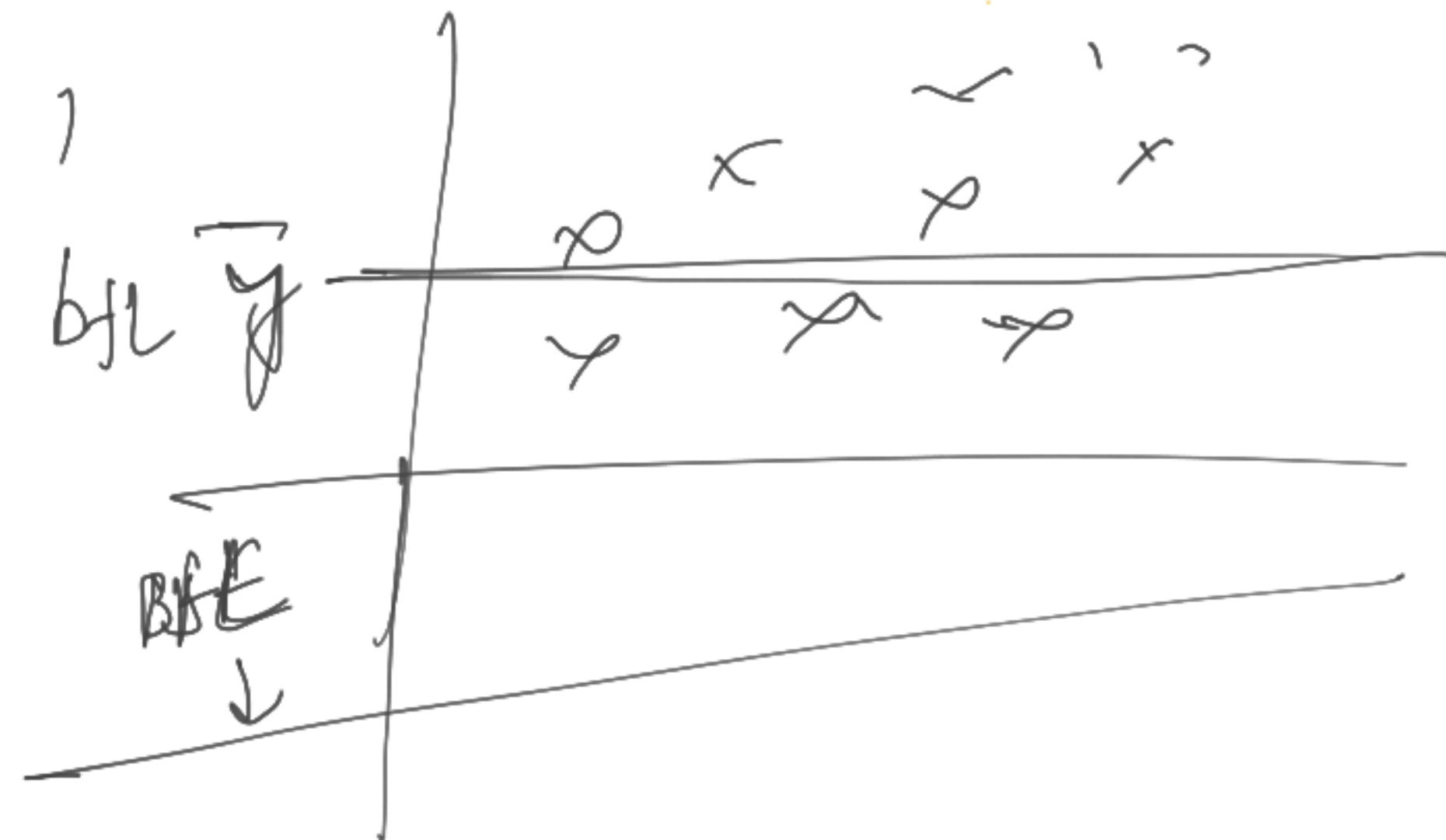
$$SSE = TSS$$

$$0.995$$

$$\frac{100}{100} = 1$$

by y

BSE



$(y_i - \hat{y})^2 = 4 \Rightarrow 16$
 $\frac{1}{n}$
 $200-202=2$ $30-112$ $124-130$ $126-122$ $120-125$
 $(2)^2 + (2)^2 + (4)^2 + (4)^2 + (5)^2$
 $30K$ thousand

$4 + 4 + 16 + 16 + 25$

$= 165$

$= 11.3$

3.6

RMSE

units

$120 \rightarrow 1133$
 1107

$12.0 \div 3 = 123$
 117

