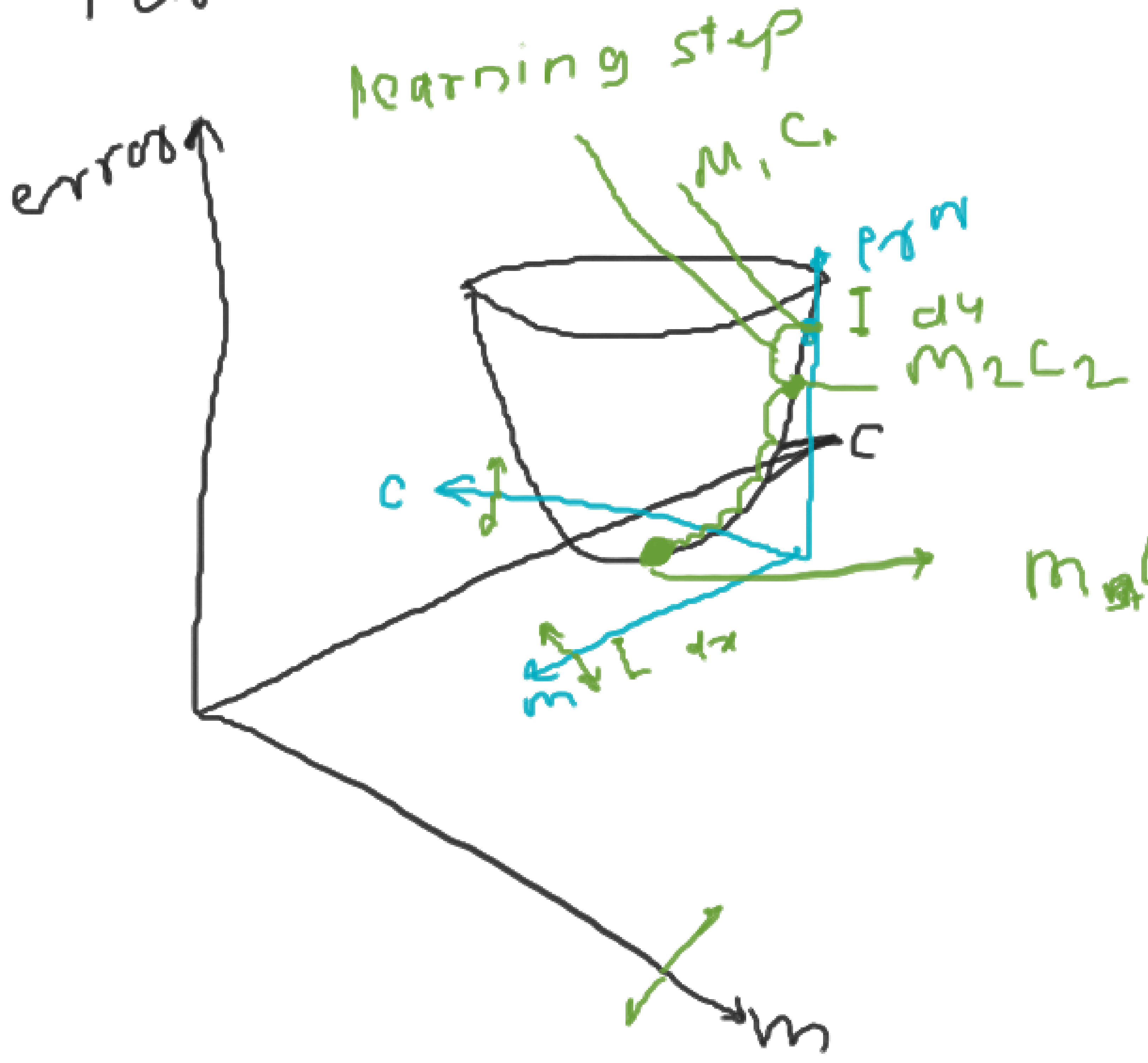
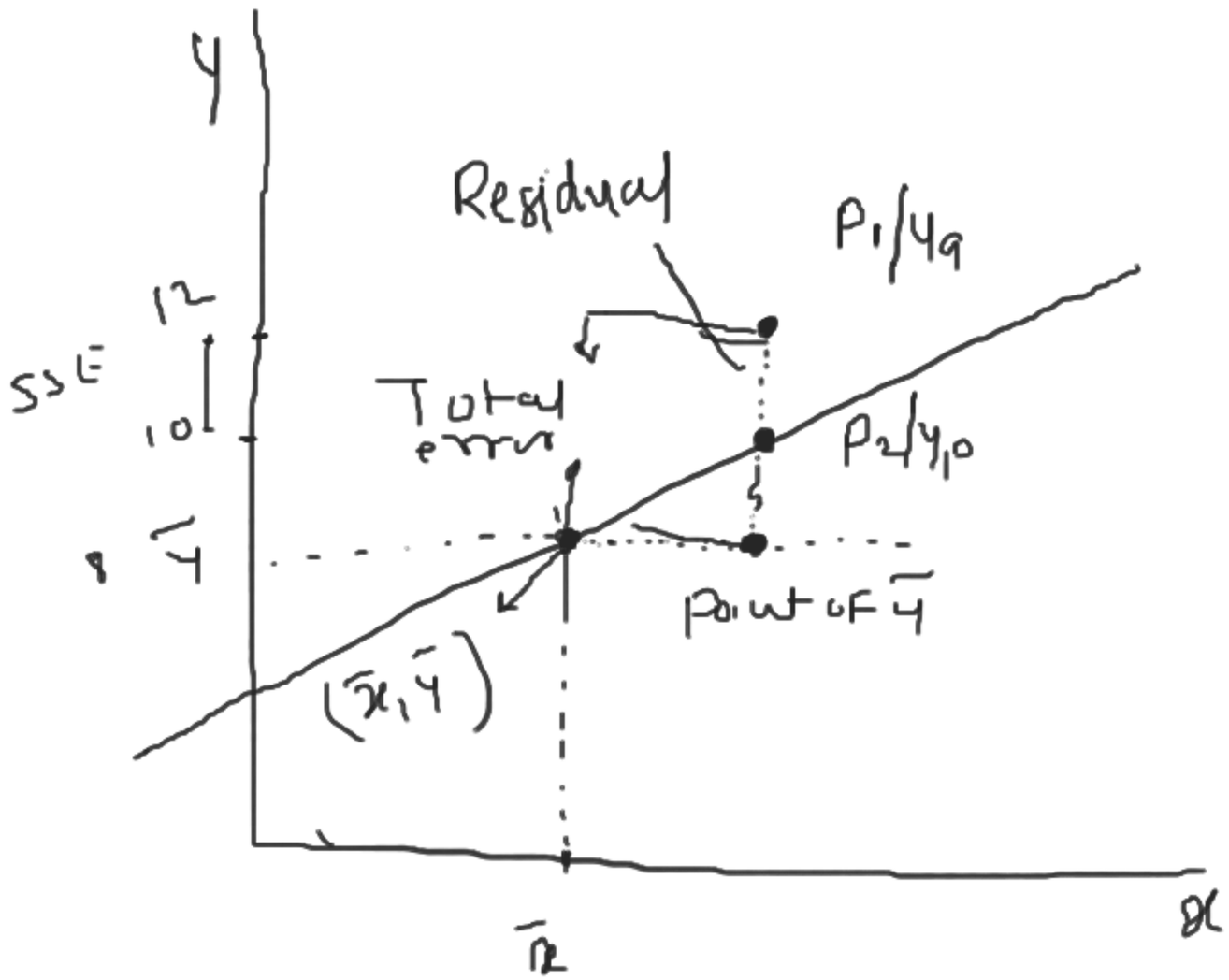
Partial Derivative



$\frac{dy}{dx}$ → error → m d c

$m_1 c_1$ 2000

$m_n c_n$ → Global minima
Best m & c value



$\bar{y}$ = expected value

$P_1 - P_2$ = Residual error = SSE
$y_1 - y_2$ (RSS)

$P_2 - \bar{y}$ = Regression error = SSR
$y_p - \bar{y}$

SST = Residual + Regression

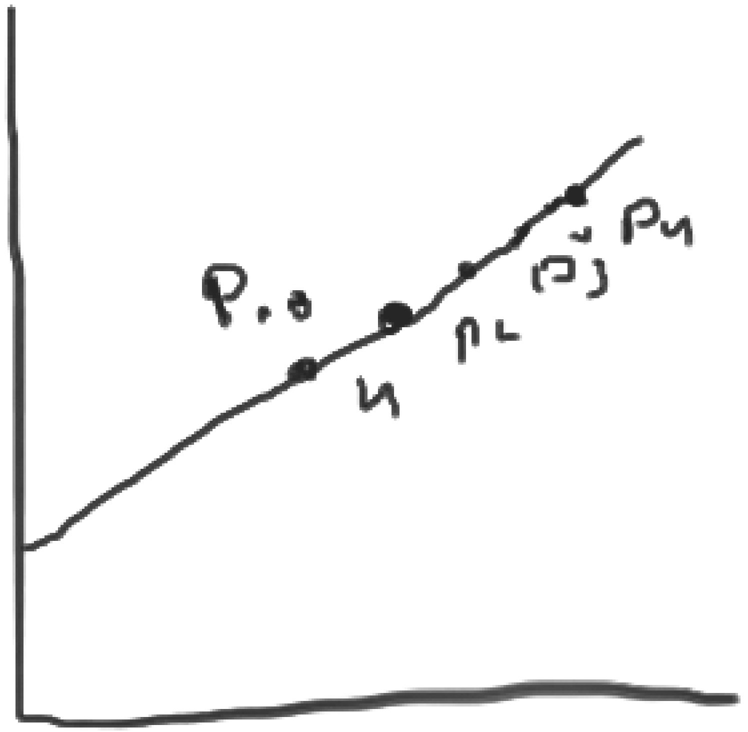
$= (y_q - \bar{y}) = 12 - 8 = 4$

$= (12 - 10) + (10 - 8)$

$= 4$

A	B	C (Target)	Yp
2	3	5	4
3	4	6	6
1	⋮	⋮	8
⋮	⋮	⋮	7
100	94	85	

150	120	
131		



$$\text{Res} = (y_a - y_p)^2$$

$$= \frac{\sum (y_a - y_p)^2}{n}$$

$$\text{Reg} = (y_p - \bar{y})^2$$

$$= \frac{\sum (y_p - \bar{y})^2}{n}$$

$$\text{SST} = \frac{\sum (y_a - \bar{y})^2}{n}$$

R - identify good pred | ind feature

R^2 score = Coeff. of determination

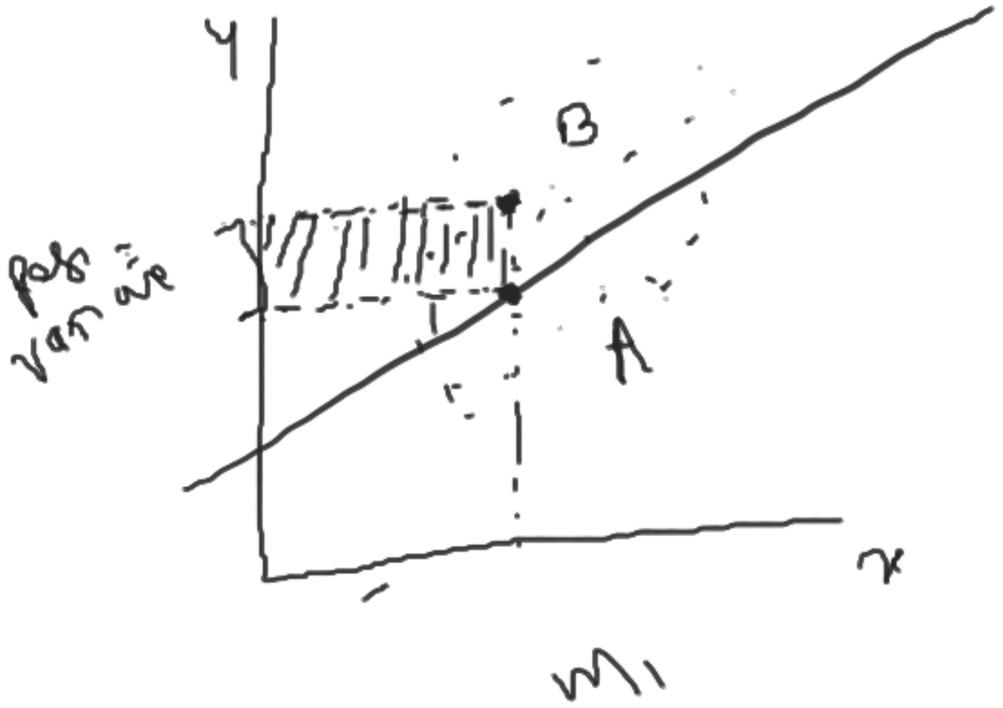
if ind var = 1

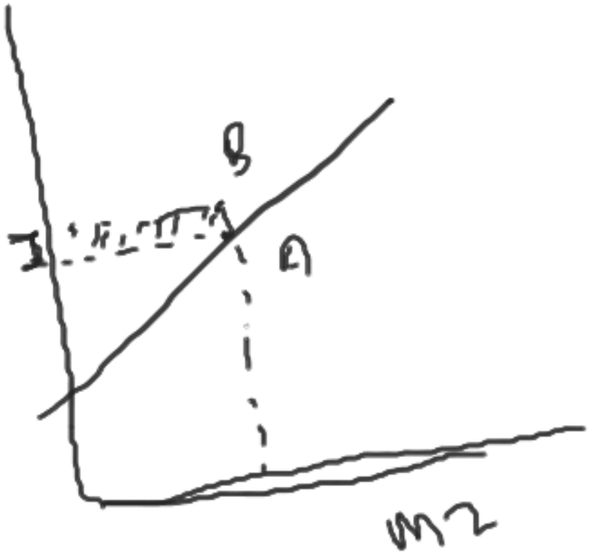
R^2 = coeff of determination

if ind var > 1

R^2 = coeff of multiple determination

R-squared value





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

$$= 1 - \frac{\Sigma (y_a - y_p)^2}{\Sigma (y_a - \bar{y})^2}$$

$$= 0.78$$

$R^2 = 1$, accuracy = 100 %.

~~SSE > SST~~

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

$$= 1 - \frac{40}{50}$$

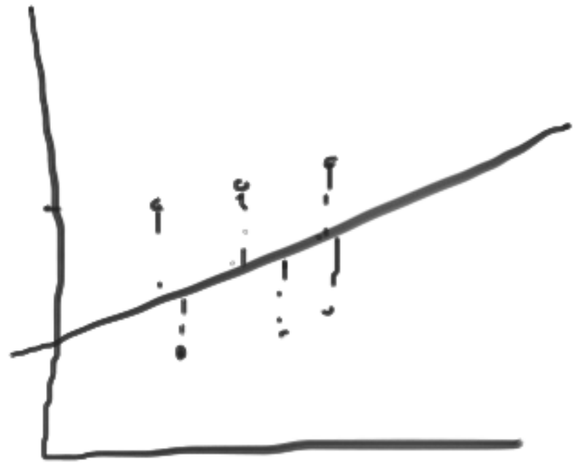
$$= 1 - 0.8$$

$$= 0.2$$

$$R^2 = 1 - \frac{50}{40}$$

$$= 1 - 1.25$$

$$= -0.25$$



when

$SSE = 0$

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

$= 1 - 0$

$= 1$

when

$SST > SSE$

$R^2 = 1 - \frac{4}{5}$

$= 1 - 0.8$

$= 0.2$

0 - 1

when

$SSE > SST$

$R^2 = 1 - \frac{5}{4}$

$= 1 - 1.25$

$= -0.25$

$$1 - \frac{SST - SSE}{SST}$$