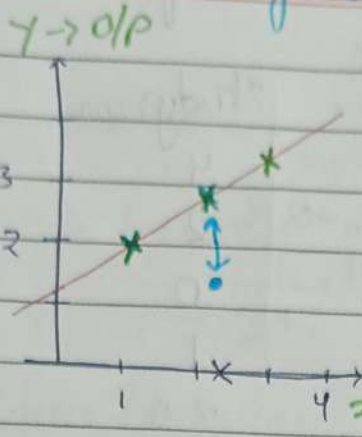
Ridge and Lasso Regression



Training Set

x	y
1	2
4	3

=> linear Regression

x → [ ] → y

Overfitting

Train Accuracy = 90%
Test Accuracy = 70%

Low Bias
High Variance

Underfitting

Train Accuracy = 60%
Test Accuracy = 62%

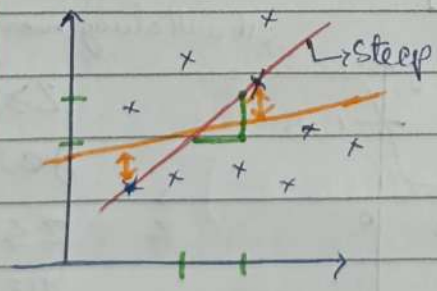
High Bias
High Variance

Generalized Model

Train Acc = 90%
Test Acc = 89%

Low Bias
Low Variance

Ridge Regression (L_2 Regularization)



$\lambda = 1$

Cost function

$$= \frac{1}{2m} \sum_{i=1} (h_\theta(x)^{(i)} - y^{(i)})^2$$

$$\Rightarrow (h_\theta(x)^{(i)} - y^{(i)})^2 + 1 (\text{slope})^2$$

$$= 0 + 1(2)^2$$

$$= 4 \downarrow\downarrow\downarrow$$

$$\Rightarrow \{\text{small value}\} + 1(1.3)^2$$

$$\Rightarrow \approx 2.05 \downarrow\downarrow\downarrow$$

Lasso Regression (L_1 Reg...)

$$(h_\theta(x)^{(i)} - y^{(i)})^2 + \lambda |\text{slope}| \qquad \lambda \geq 1$$

$\lambda (\text{slope})^2$ → slope

$y = mx + c$

$\lambda (m)^2$

$\lambda |m_1 + m_2 + m_3 + \dots m_n|$

$y = \theta_0 + \theta_1 x_1 + \theta_2 x_2 + \theta_3 x_3 + \dots$

$\theta \Rightarrow$ Slope

① Overfitting Prevent
② Feature selection