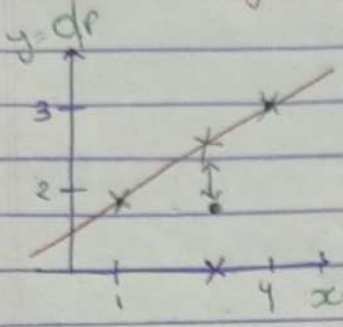
Ridge and Lasso Regression



Traning set

x	y
1	2
4	3

⇒ Linear Regression

$x \rightarrow \square \rightarrow y$

Overfitting

Train Accuracy = 90%
Test Accuracy = 70%
Low Bias
High Variance

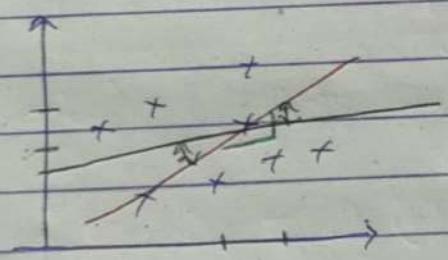
Underfitting

Train Acc = 60%
Test Acc = 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 → Residual error

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

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

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

$$= 4$$

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

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

Lasso Regression (L_1 Reg...)

$$(h_\theta(x)^{(i)} - y^{(i)})^2 + \lambda |\text{slope}| \quad \lambda |m|$$

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

$\lambda (\text{slope})^2$ → slope

$y = mx + c$

$\lambda (m)^2$

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

① ⇒ Slope

{① Overfitting prevent
② Feature selection}