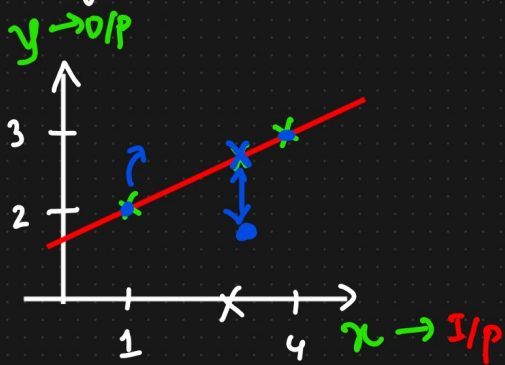


Ridge and Lasso Regression Math Intuition



Training Set

x	y
1	2
4	3

\Rightarrow Linear Regression



Model

Overfitting

Train Accuracy = 90%

Test Accuracy = 70%

Low Bias
High Variance

Underfitting

Train Accuracy = 60%

Test Data = 62%

High Bias
High Variance

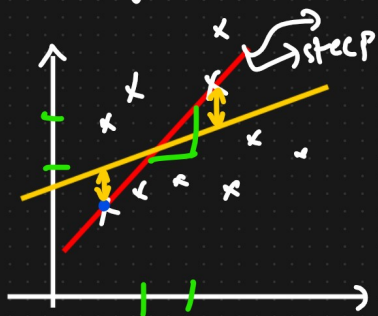
\rightarrow Generalized Model

Train Acc = 90%

Test Acc = 89%

Low Bias &
Low Variance

Ridge Regression (L_2 Regularization)



$\lambda = 1$

Cost function

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

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

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

$$= 4$$

① Overfitting is removed

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

$$\Rightarrow \approx 2.05$$

$$y = mx + c$$

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

Lasso Regression (L_1 Regularization)

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

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

- ① Overfitting prevent ✓
- ② Feature selection ✓