✡ Feature selection or feature reduction

x_1	x_2	x_3	x_4	x_5	x_6	y

✡ VIF

✡ Reglarisation

1. Lass L_1
2. Ridge L_2
3. Elasticnet Regularisation

① L_1 (Lasso) –

To select feature or Reduce feature

$$L_1 = \frac{1}{m} \sum_{i=1}^{m} [h_\theta(x^i) - y^i] + \lambda |slop|$$

$$h_\theta(x) = \theta_0 + \theta_1 x_1 + \theta_2 x_2 + \theta_3 x_3 + \theta_4 x_4$$

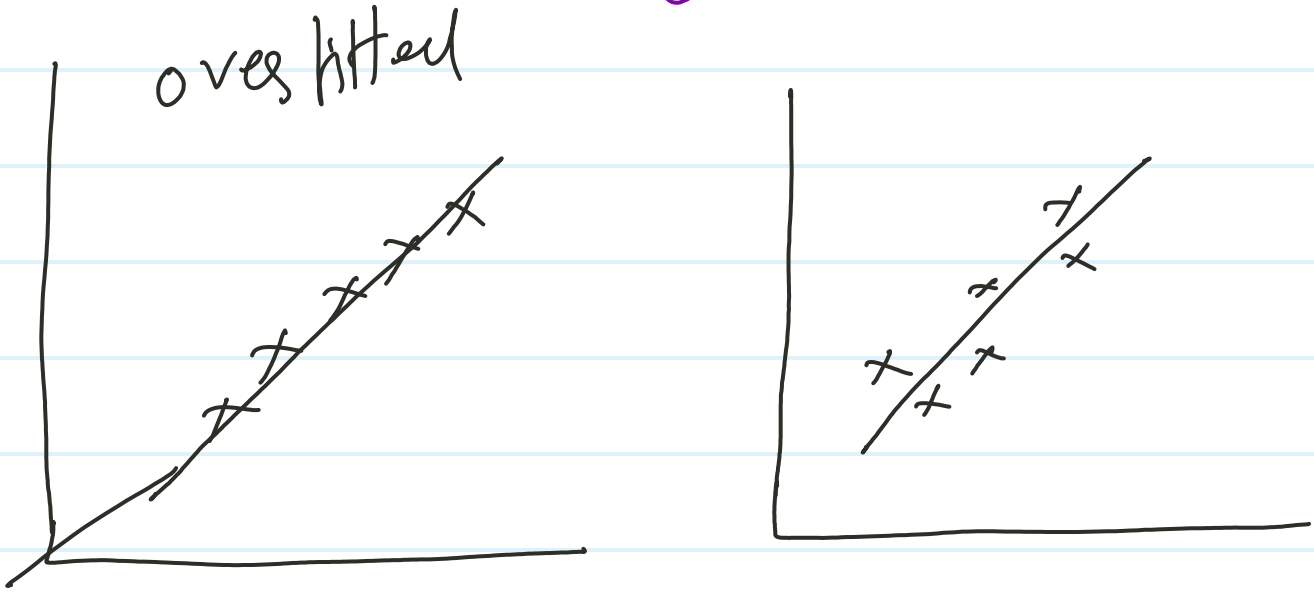
$\Rightarrow 0.5 + 0.54x_1 + 0.25x_2 + 0.01x_3 + 0.2x_4$

Will reduce $\theta_3 x_3$ feature from dataset.

L_2 Ridge –

To reduce overfitting of model

overfitting – low bias
High variance



$$L_2 = \frac{1}{m}\sum_{i=1}^{m}\left[h_\theta(x)^i - y^i\right] + \lambda(slop)^2$$

λ hypse paeumetes

(1, 2, 0.5, 0.9, 3, 4 - - - - ...)

slop $= \theta$

$$Y = mx + C$$

Relationship b/w λ and θ
It is inversaly propotional

$\lambda \uparrow \quad \theta \downarrow$

③ Elasticnet Regularisation

Combination of Ridge and Lasso

$$\text{elasticnet} = \frac{1}{m}\sum_{i=1}^{m}\left[h_\theta(x)^i - y^i\right] + \lambda(\text{slop})^2 + \lambda|\text{slop}|$$

✱ Assumption of linear Regression

① Independent and dependent variable must be having linear relation.

② Mean of residual error should be zero.

③ Error term arenot suppose to be co-related

④ Independent variable and residual error suppose to be uncorrelated [Exogeneity]

⑤ Error term must showcase constant varience [Homoscedasity]

⑥ No multicolinearity [$x_1, x_2 x_3 x_4$]