L1 and L2

L1 Regularization(Lasso Regression)
L2 Regularization(Ridge Regression)

Regularization

- **Regularization is used to reduce overfitting**
- Regularization is a form of regression, that constrains/ regularizes or shrinks the coefficient estimates towards zero. In other words, **this technique discourages learning a more complex model, so as to avoid the risk of overfitting**.

Lasso L1 Regularization

$$\sum_{i=1}^{n}(Y_i - \sum_{j=1}^{p} X_{ij}\beta_j)^2 + \lambda \sum_{j=1}^{p} |\beta_j|$$

Lasso regression adds “absolute value” as penalty term

Ridge L2 Regularization

$$\sum_{i=1}^{n}(y_i - \sum_{j=1}^{p} x_{ij}\beta_j)^2 + \lambda \sum_{j=1}^{p} \beta_j^2$$

Ridge regression adds “squared magnitude” of coefficient as penalty term to the loss function.

Lasso L1	L2 Ridge
Adds “Absolute Value” as Penalty	Adds “Sum of Square” as Penalty
Used in Feature Selection	No Feature Selection
Robust to Outliers	Not Robust to Outliers