LASSO REGRESSION

AND

RIDGE REGRESSION

ridge **regression** and **lasso** are **regression** techniques optimized for prediction, rather than inference. Normal **regression** gives you unbiased **regression** coefficients (maximum likelihood estimates "as observed in the data-set"). Ridge and **lasso regression** allow you to regularize ("shrink") coefficients

In statistics and **machine learning**, **lasso** (least absolute shrinkage and selection operator; also **Lasso** or **LASSO**) is a **regression** analysis method that performs both variable selection and regularization in order to enhance the prediction accuracy and interpretability of the statistical model it produces.

Tikhonov Regularization, colloquially known as **ridge regression**, is the most commonly used **regression** algorithm to approximate an answer for an equation with no unique solution. This type of problem is very common in **machine learning** tasks, where the "best" solution must be chosen using limited data.

**Ridge regression** is a type of regularisation. ... The summation term on the left is the typical RSS error measure in a linear **regression** context. But the expression on the right is a penalty term which increases as the coefficients become larger. The value of **lambda** determines the importance of this penalty term.

Ridge and **Lasso Regression** Models. ... In **lasso**, the penalty is the sum of the absolute values of the coefficients. **Lasso** shrinks the coefficient estimates towards zero and it has the effect of setting variables exactly equal to zero when **lambda** is large enough while ridge does not.

Ridge regression essentially is an instance of LR with regularisation. Mathematically, the model with ridge regression is [given](https://ncss-wpengine.netdna-ssl.com/wp-content/themes/ncss/pdf/Procedures/NCSS/Ridge_Regression.pdf)by

Y = XB + e

In the case of ML, both ridge regression and Lasso find their respective advantages. Ridge regression does not completely eliminate (bring to zero) the coefficients in the model whereas lasso does this along with automatic variable selection for the model. This is where it gains the upper hand. While this is preferable, it should be noted that the assumptions considered in linear regression might differ sometimes.

Both these techniques tackle [overfitting](https://machinelearningmastery.com/overfitting-and-underfitting-with-machine-learning-algorithms/), which is generally present in a realistic statistical model. It all depends on the computing power and data available to perform these techniques on a statistical software. Ridge regression is faster compared to lasso but then again lasso has the advantage of completely reducing unnecessary parameters in the model.