EMBEDDED METHODS

LASSO REGULARISATION

REGULARISATION

Regularization consists in adding a penalty on the different parameters of the model to reduce the freedom of the model. Hence, the model will be **less likely to fit the noise** of the training data and will improve the generalization abilities of the model. For linear models there are in general 3 types of regularisation:

- The L1 regularization (also called Lasso)
- The L2 regularization (also called Ridge)
- The L1/L2 regularization (also called Elastic net)

REGULARISATION: LASSO

$$\frac{1}{2m} \times \sum (y - ypred)^2 + \lambda \sum \emptyset^1$$

m = number of observations

Y = observed output

Ypred = predicted output $\emptyset_1 X_1 + \emptyset_2 X_2 + \ldots + \emptyset_n X_n$

λ is the regularisation parameter

L1 / Lasso will **shrink some parameters to zero,** therefore allowing for feature elimination.

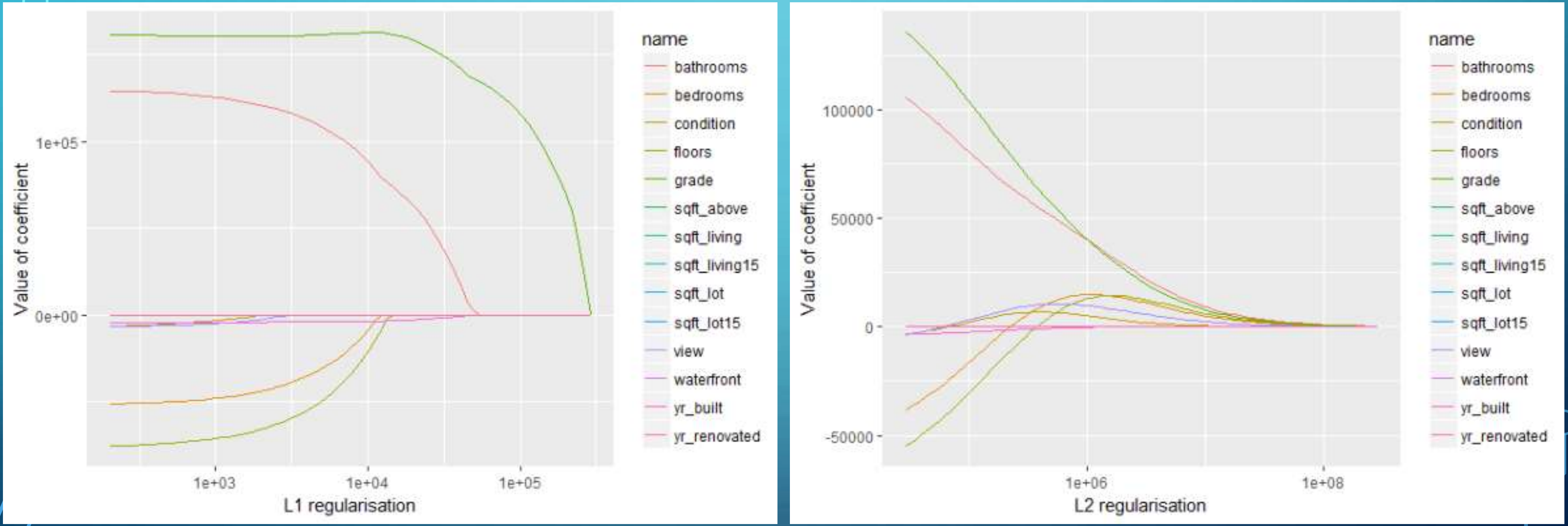
REGULARISATION: RIDGE

$$\frac{1}{2m} \times \sum (y - ypred)^2 + \lambda \sum \emptyset^2$$

m = number of observations
Y = observed output
Ypred = predicted output $\emptyset_1 X_1 + \emptyset_2 X_2 + \ldots + \emptyset_{n1} X$
λ is the regularisation parameter

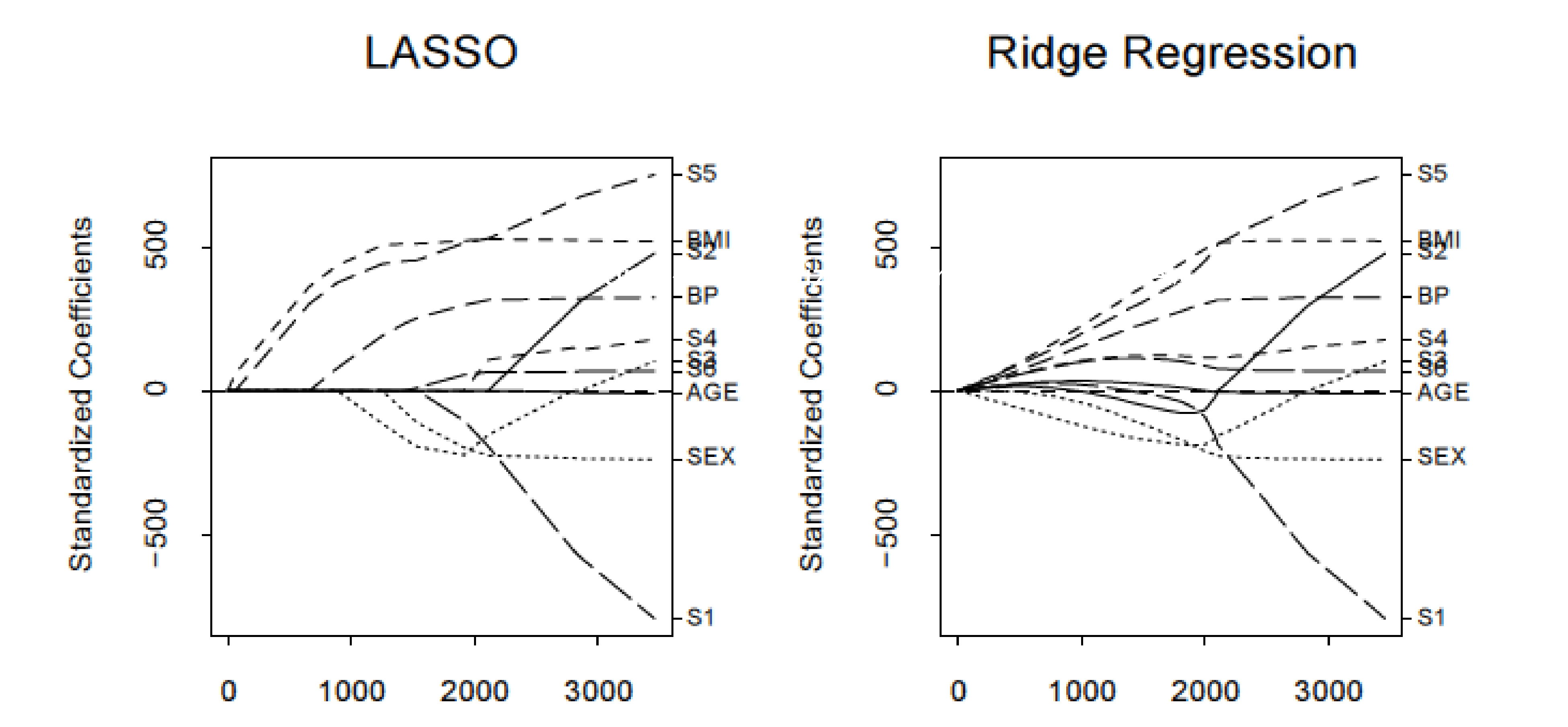
For l2 / Ridge, as the penalisation increases, the coefficients approach but do not equal zero, hence no variable is ever excluded

LASSO VS RIDGE



https://www.r-bloggers.com/machine-learning-explained-regularization/

LASSO VS RIDGE



Least angle and ℓ1 penalized regression: A review. Hesterberg et al. Statistics Surveys, 2008

EMBEDDED METHODS: LASSO

By fitting a linear or logistic regression with a Lasso regularisation, we can then evaluate the coefficients of the different variables, and remove those variables which coefficients are zero.