The objective function for lasso for a linear regression model:

The objective function for adaptive lasso for a linear regression model:

where is a known weights vector.

A researcher would prefer to use adaptive lasso when the lasso is inconsistent for variable selection. The adaptive lasso where adaptive weights are introduced to penalize different coefficients in the penalty (i.e., the second term in the objective function for lasso) enjoys the oracle properties, which means that it performs as well as if the true underlying model was given in advance. Nevertheless, the adaptive lasso entails a finite sample bias in the non-zero coefficient estimates. As sample size grows, the data-dependent weights for zero-coefficient predictors get inflated (to infinity), whereas the weights for nonzero coefficient predictors converge to a finite constant. The adaptive lasso should therefore be adopted so the researcher could select the true zeros only, unbiasedly (asymptotically) re-estimate large coefficients and small threshold estimates in finite samples.