**Individually Penalized Ridge Regression**

* The basic idea is to, instead of having one ridge regularization parameter for all predictors, we introduce a unique parameter for each predictor
* I.e., we change the optimization problem from:

to:

* Here is a nonnegative parameter assigned to each predictor individually
  + This allows one to assign larger penalty parameters to small coefficients and smaller penalty parameters to large coefficients, making variable selection easier and more intuitive with ridge regression
  + The extreme case of leads to a coefficient of exactly 0
* By reparametrizing , the author uses this optimization problem to create a method for variable selection that comes from solving:

subject to the constraints and , where is a regularization parameter

* Author writes that the above problem can be efficiently solved using a modified coordinate descent algorithm
* Note: author also calls this new method the **ridge selection operator (RSO)**
* The operator scaled decently to a higher dimensional case with 1000 predictors and 200 observations, always correctly selecting the true predictors, but selected unimportant predictors at a higher rate than several other methods (including LASSO), though not at a vastly higher rate than LASSO
* Author also writes that a refitting step in the operator may help refine both selection and prediction results (though we may be more interested in selection than prediction)