

# Ridge vs. Lasso Regression

## Ridge

- + Reduces Multicollinearity
- + Continuous Shrinking
- + Stable Solutions
- + Computationally Efficient
- No variable selection
- Interpretability
- Sensitive to scale

## Lasso

- + Variable selection
- + Sparse models
- + Improves interpretability
- + Particularly useful for when  $p > n$
- Collinearity issues
- Bias in coefficients ( $\ell_1$  penalty is harsher)
- Computationally intensive

# $\lambda$ Tuning

- $K$ -fold Cross Validation
  1. Choose the number of folds  $K$
  2. Split the data accordingly into training and testing sets.
  3. Define a grid of values for  $\lambda$
  4. For each  $\lambda$ , calculate the validation MSE within each fold
  5. For each  $\lambda$ , calculate the overall cross-validation MSE
  6. Locate under which  $\lambda$  cross-validation MSE is minimized, i.e. **minimum\_cv**  $\lambda$
- Packages such as `glmnet` do this automatically

