

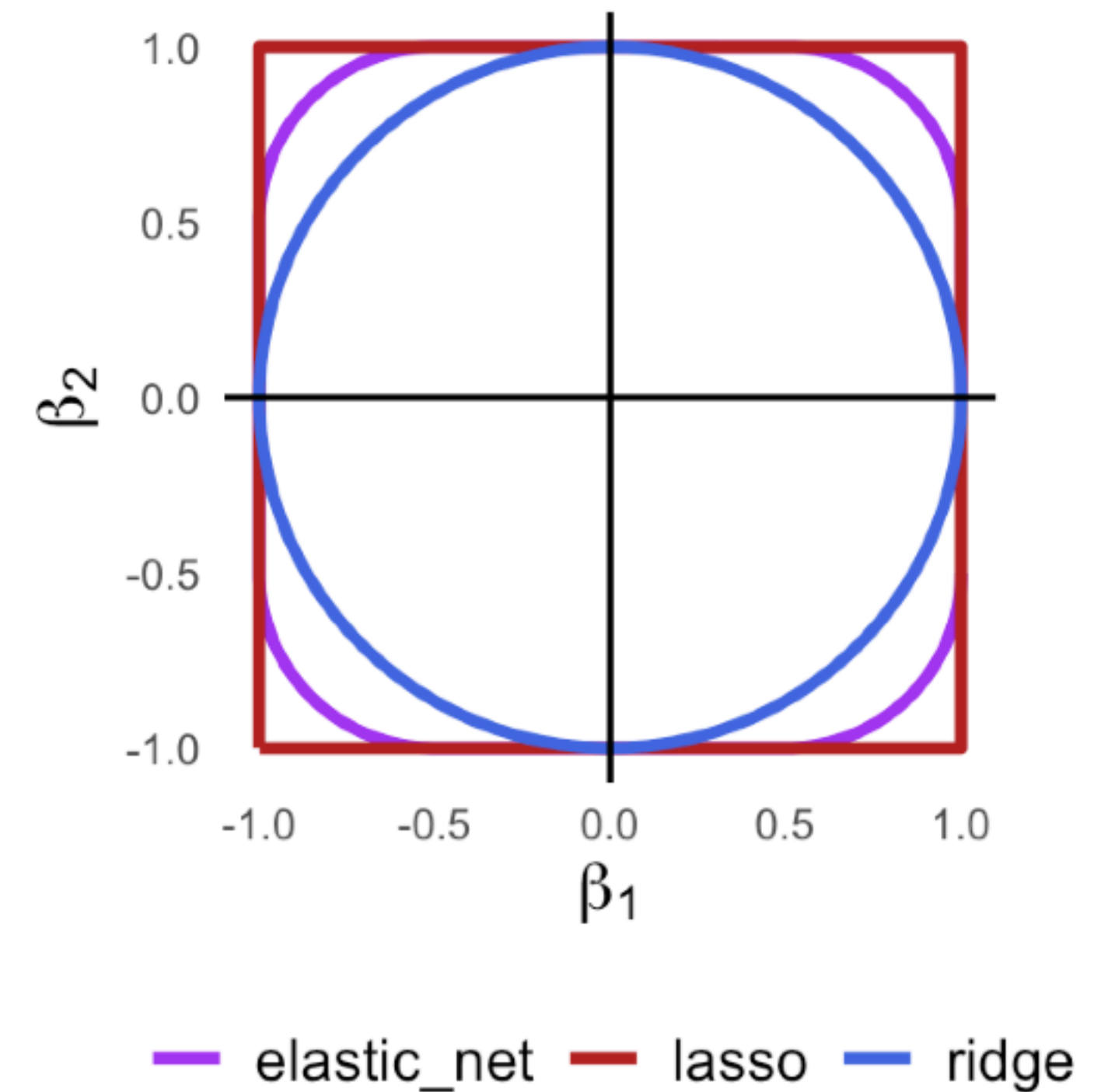
λ Tuning

- 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 λ
 4. For each λ , calculate the validation MSE within each fold
 5. For each λ , calculate the overall cross-validation MSE
 6. Locate under which λ cross-validation MSE is minimized, i.e. **minimum_cv** λ
- Packages such as `glmnet` do this automatically



Hybrid Approach: Elastic Nets

$$\text{RSS} + \underbrace{\lambda_1 \sum_{j=1}^p \beta_j^2}_{\text{"ridge"}} + \underbrace{\lambda_2 \sum_{j=1}^p |\beta_j|}_{\text{"lasso"}}$$



λ_1 and λ_2 are regularization parameters controlling the strength of the penalties

- Helps stabilize the solution when predictors are correlated
- Shrinks some coefficients to zero, enabling feature selection
- Particularly useful for high-dimensional datasets with correlated predictors