Below are the testing we have considered to evaluate our Reclasso [Homotopy Lasso model]

1. **Collinearity Test (test\_lasso\_collinearity()):**

Purpose: Verify LASSO model's performance on highly correlated features

Key Objectives:

- Assess model's ability to handle multicollinearity

- Validate feature selection in complex datasets

- Ensure sparsity across different correlation strengths

Why Necessary:

- Real-world datasets often have correlated features

- Tests model's ability to select most important features

- Ensures regularization effectively manages feature complexity

1. **Coefficient Sparsity Test (test\_coefficient\_sparsity())**

Purpose: Validate LASSO's core regularization principle

Key Objectives:

- Verify sparsity increases with lambda

- Ensure model can reduce feature complexity

- Test consistency across different datasets

Test Approach:

- Apply multiple lambda values

- Check number of zero coefficients

- **Ensure higher lambda produces sparser solutions {important as mentioned by the professor in the project]**

Assertion:

assert zero\_coeff\_count >= len(coefficients) - 2

# Guarantees consistent sparsity across datasets

1. **Test on synthetic data:**

We have tested our model on the 6 datasets we have created and evaluated r score and mse .