Homework2

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1 Data Analysis

Chapter 6, Problem 9 a-d

2 Conceptual

Chapter 6, Problem 5-6.

1. Some notes on Problem 5, Chapter 6

   It is well-known that ridge regression tends to give similar coefficient values to correlated variables, whereas the lasso may give quite different coefficient values to correlated variables. This problem lets us understand this property in a very simple setting.

   This notation simplification may be helpful. Suppose that there are two samples (n = 2) and two observations (p = 2), with perfect correlation, i.e., the data matrix has the form $x_{11} = x_{12} = x_1$, $x_{21} = x_{22} = x_2$, with data and response centered, i.e., $x_1 + x_2 = 0$, $y_1 + y_2 = 0$, so that the intercept $\beta_0 = 0$.

   Set up the optimization problem following (6.5) for Ridge and (6.7) for Lasso. Solve by taking derivatives with respect to β_1 and β_2 and interpret your equations.

2. Some notes on Problem 6, Chapter 6

   This is just a simple plotting exercise.