

MATLAB Assignment 8

Spring 2017, Section A

In this assignment, you will employ a simple multilinear regression on a simple data set. The assignment should be submitted to so@cooper.edu by April 26, 2017 .

1. Hald on!

- (a) Load the Hald cement dataset with *load hald*
- (b) Using the matrix division operator (*mldivide*), create a linear regression predicting the heat based on the ingredients. Allow for the possibility of a bias. Calculate the MSE.
- (c) Repeat a) using the *lasso* function with λ set to 0.001.
- (d) Now, use *load polydata*. Augment the x_1 matrix with $n < 5$ polynomials, use polynomial regression to create a prediction for y . You can choose n , try to experiment and see what works best.

2. Girl look at that Bode! A continuous time system is characterized by the following equation:

$$f = t^5 e^{-2t} \sin(5t) + t^3 e^{-3t} \cos(4t) + t \cos(10t)$$

- (a) Take the Laplace Transform of the above equation. (*Hint* : Use the symbolic toolbox!)
- (b) Use *numden* and *coeffs* to extract the coefficients from the Laplace transform. Use *double* to convert them to numeric form.
- (c) Make a bode plot for the equation you obtained above. Turn the grid on. Why does the grid look like that?