Regression analysis and re-sampling methods

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Abstract

1 Introduction

The main aim of this project is to study in more detail various regression methods, including the Ordinary Least Squares (OLS) method, Ridge regression and finally Lasso regression. In addition resampling techniques. Start by fitting polynomials to Franke's function (see Methods).

Project flow: This project starts by introducing

Main findings

2 Methods

2.1 Franke's function

Describe Franke's function.

$$f(x,y) = \frac{3}{4}\exp\left(-\frac{(9x-2)^2}{4} - \frac{(9y-2)^2}{4}\right) + \frac{3}{4}\exp\left(-\frac{(9x+1)^2}{49} - \frac{(9y+1)}{10}\right) \tag{1}$$

$$+ \frac{1}{2}\exp\left(-\frac{(9x-7)^2}{4} - \frac{(9y-3)^2}{4}\right) - \frac{1}{5}\exp\left(-(9x-4)^2 - (9y-7)^2\right). \tag{2}$$

2.2 Regression methods

2.2.1 Ordinary Least Squares (OLS)

2.2.2 Ridge Regression

2.2.3 Lasso Regression

2.3 Re-sampling techniques

2.4 Bias Variance tradeoff

2.5 Algorithm implementation

3 Results

4 Discussion of results

4.1 Conclusions