Notes on project 1

Wednesday, September 7, 2022 8:27 AM

- Aim of project
  - study various regression methods
  - get experience in writing scientific reports

- Recommendation
  - start with developing and testing code for one-dimensional function (similar to exercises week 35)
  - to test, set the design matrix equal to the identity matrix. Should give MSE = 0
  - after testing, replace one-dimentional function with two-dimentional **Franke** function
  - we can use a uniform distribution to set up the arrays

- Key words
  - Franke function: weight of sum of four exponentials
  - cross-validation
  - bootstrap
  - bias-variance trade off

- Steps
  - perform OLS regression analysis of the Franke function trying a polynomial fit of the form $[x, y, x^2, y^2, xy, \dots]$
  - include bootstrap first for resampling
  - include cross-validation
  - fit a function of x and y
  - repeat much of the same procedure using Ridge and Lasso regression, introducing thus a dependence on the bias (penalty) λ
  - finally: use real digital terrain data and try to reproduce these data using the same methods as listed above
  - also: try to og beyond the second-order polynomials and explore which polynomials fits the data best