Introduction to Intelligent Systems / Lab 2

Regularized regression

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Due: Before the next lab session.
Evaluation: Code and explanation about the code (in groups of up to 3 people)
Remark:

- Only groups of one/two/three people accepted. Forbidden groups of larger number of people.
- No late homework will be accepted.
- No plagiarism. If plagiarism happens, both the "lender" and the "borrower" will have a zero.
- Code yourself from scratch. No homework will be considered if you solve the problem using any ML library.
- Do thoroughly all the demanded tasks.
- Study the theory for the questions.

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1 Tasks

1. Download the data set for this lab from the course site available on campus.ece.fr, and divide the data in two parts: training data (70%) and test data.
2. Find the optimal regression parameters for the following types of hypothesis functions (using the closed-form solution):
   a) unregularized linear
   b) unregularized parabolic
   c) unregularized 5th-order polynomial
   d) regularized 5th-order polynomial (RIDGE)
3. Plot the training data as well as the fitted curves.
4. Compute and compare the residuals (i.e., errors) between the training output and the predicted training output for all the considered hypothesis functions.
5. Plot the test data as well as the fitted curves.
6. Compute and compare the residuals (i.e., errors) between the test output and the predicted test output for all the considered hypothesis functions.

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