[Lab 2] Regularized regression

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Due: Before the next lab session.
Evaluation: Code and explanation about the code (in groups of only two or three people)
Remark:

- Only groups of two or three people accepted. Forbidden groups of one person or larger than three 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 file **data_lab2_3.txt** from the course site available on campus.ece.fr, and divide the data in two parts:
   - training data: the first 80% of the original data set.
   - test data: the last 20% of the original data set.
2. Find the optimal regression parameters for the following types of hypothesis functions (using only the closed-form solution (CFS)):
   a) unregularized linear
   b) unregularized parabolic
   c) unregularized 3rd-order polynomial
   d) regularized 3rd-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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