

Assignment 2

(10 points)

- (1) Build a multimodal Gaussian distribution with synthetic data.
- (2) Construct a piecewise linear regression and plot the result with its splines and knots.
- (3) Construct a piecewise polynomial regression and plot the result, its splines, and knots.
- (4) In addition to F-statistics that you use to decide about the number of knots, report RSME and R^2 for all models.
- (5) Try to model the multimodal Gaussian distribution built with single polynomial regression.
- (6) Measure and report the execution time of tasks (2), task (3), and task (5). Then report the differences in execution time (no plot required, but you need to report them in a table). Hint: use excel for table drawing and add it in the word file.
- (7) Use the Multimodal Gaussian distribution of Tasks 5, apply Ridge, LASSO and compare their accuracy and number of parameters, parameters coefficient with Polynomial regression. Here you should also report and discuss the differences (if there are any differences)

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- If you have any trouble during your work, please contact the TA before the deadline. The TA will help you progress in your homework, but she will not provide you with the answer.
 - Late homework delivery results in a penalty on your grade, every late day 10%.
 - Sharing this assignment with a party outside this course is a Boston University code of conduct violation, and violators will be reported to the dean for further prosecution.