

User:

write the following abstract better:

We analyze and compare the various approaches of Polynomial Regression to model the Runge function with noise which can be seen as an arbitrary one dimensional function. In particular, we discuss Ordinary Least Squares, Ridge and Lasso Regression and find in our simulations OLS as model with the smallest error which can be verified by theoretical calculations. To take computational aspects into account it follows an extended discussion of the state of the art Gradient Descent approaches including Stochastic gradient descent and adapted learning rates like Momentum, Adagrad, RMSprop and Adam. In general, these gradient desents are computationally cheaper than analytic formulas but the results are not that precise. This results in our recommendation to use analytic OLS for small datasets. We conclude with bootstrap results about the bias variance tradeoff and our finding that crossvalidation outperforms bootstrap at estimating the error of our model.

Assistant:

Here's a more polished version of your abstract, keeping it precise and formal while improving flow and readability:

We investigate different polynomial regression methods for modeling the Runge function with noise, treating it as a representative one-dimensional problem. Specifically, we compare Ordinary Least Squares (OLS), Ridge, and Lasso regression. Our simulations show that OLS achieves the lowest error, a result consistent with theoretical analysis. To address computational considerations, we extend the discussion to modern gradient-based optimization methods, including Stochastic Gradient Descent and variants with adaptive learning rates such as Momentum, Adagrad, RMSprop, and Adam. While these approaches are generally more efficient than analytic solutions, they tend to produce less precise results. Based on this trade-off, we recommend analytic OLS for small datasets. Finally, we present bootstrap analyses of the bias–variance tradeoff and demonstrate that cross-validation provides more reliable error estimates than bootstrap in this context.

Do you want me to make it more ****formal-academic**** (journal style) or ****clear and concise**** (conference/short-paper style)?

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