Linear Methods for Regression

A linear regression model assumes that the regression function is linear in the inputs . We have an input vector and want to predict a real-valued output . The linear regression model has the form

(1)

The linear model either assumes that the regression function is linear, or that the linear model is a reasonable approximation. The ’s are unknown parameters and the variables can come from different sources:

* quantitative inputs
* transformations of quantitative inputs, such as log, square root or square
* basis expansions such as , , leading to a polynomial representation
* numeric or “dummy” coding of the levels of qualitative inputs. For example, if is a five-level factor input, we might create , such that . Together this group of represents the effect of by a set of level-dependent constants, since

# References

[1] Chapter 3 of [The Elements of Statistical Learning; Data Mining, Inference, Prediction, Trevor Hastie, Robert Tibshirani, Jerome Friedman, Second Edition, 2017](https://github.com/dimitarpg13/statistical_learning_and_kernel_methods/blob/main/literature/books/EelementsOfStatisticalLearning_print12.pdf)