Advanced Predictive Models: Lab I

May 24 , 2021

In this simple case study you will have a look at how to fit generalized linear models in `R`. Specifically, you will see how to fit a logistic regression model. As an example, we will consider the o-rings data to study the relationship between the damage of o-rings and temperature. A brief introduction to the data has been given at the beginning of the logistic regression model section.

The data are available in the `R` package `faraway`. I have uploaded to Moodle an `R` script that gives an analysis of the data. The goal of this study is to determine if temperature affects the probability of o-rings' damage. If yes, how can you describe the relationship?

In this study, I would like you to do a list of tasks:

1. Write a paragraph to summarize the results from the model using the logit link function.
2. You can see the z-values and tail probabilities from the summary of the logistic model. Explain how these values are obtained and what they are used for.
3. Compute Wald and likelihood ratio confidence intervals for the model parameters.
4. Show how to use the likelihood ratio test for comparing the logistic model and the intercept-only model.
5. Use deviance to determine if the logistic model fits the data well.
6. Compare the logistic model and the probit model for this dataset.
7. Add fitted lines to the original plot.
8. Estimate the probability of damage at 31 °F.