

Exercises chapter 4

1. Use the data simulation of chapter 4.1.1, fit the regression and give the posterior probability of the hypothesis „the regression slope is between 0.5 and 1“.
2. The measurement of wing length in birds is difficult because the wing has to be flattened to the ruler. The strength with which the wing is flattened depends on the observer and thus there is a large between-observer variance in wing length measurements. A more constant measurement is the length of the third outermost wing feather (primary 8). How well does the length of primary 8 represent wing length? Do a regression analysis of wing length on feather length (P8) using the data `periparusater.txt`. Fit the model, check the model assumptions (residual analysis) and draw the regression line with the Bayesian 95% credible interval and 95% prediction interval.
3. Explain the difference between prediction interval and credible/confidence interval.
4. Use the Ellenberg data, select the data for the two species Ap and Dg (as in chapter 4.2.6) and fit an ANCOVA including a quadratic effect of Water and the interaction of the quadratic effect with species. Plot the two regression lines including the 95% credible intervals.