

## Chapter 3 Homework

15 September 2023

Use the two models ( $W = kl^3$  and  $W = klg^2$ ) and data given in Problem 3.4.7 in your textbook to do the following:

- Create 2 new data sets (thus you will have a total of 3 data sets to use). In the first of the new data sets, add more error to each of the three variables (length, girth, and weight). Use the `rnorm()` function to add in error. In the second new data set, use your “noisier” data to create outliers in the data for the weight variable.
- For each of the three data sets, apply the 5 different criteria (e.g., Chebyshev, least-squares) we used in class to obtain a fitted model. Plot the fitted models on a single plot.
- For each of the 5 different criteria, run 6 different `optim()/minimize()` methods (Nelder-Mead, BFGS, CG, L-BFGS-B, SANN, Brent) and make a table to pick the best method for the criteria (i.e., just as I did in the end of the Chapter 3 example). If any of the algorithms is better than the default Nelder-Mead, re-run the optimization using that algorithm and plot the differences.
- For each of the 3 data sets, choose which criteria + algorithm combination you think is best. Justify your answers!

Let me know if you have questions. This assignment is due Friday, 22 September.