

STATISTICS FOR EES — EXERCISE SHEET 1

1. From

https://syncandshare.lrz.de/getlink/fiGSnqGds4DsB937Gjme9w/bluearea_estimates_2019.csv or from

https://syncandshare.lrz.de/getlink/fiFz23DxeHVZhrDUrmLYrQ/bluearea_estimates_2025.csv take the values estimated for figure 2 by the first five students A, B, C, D and E, and calculate

- with your pocket calculator (or only pocket-calculator-like functions in R) the mean value, the median, the variance, the standard deviation and the standard error for these five values.
- Do the same with R with the functions that are available for this in R.
- Calculate these statistics for all students' estimations for figure 2.

Hint: The following command will read the data into R:

```
data <- read.csv("https://syncandshare.lrz.de/getlink/fiGSnqGds4DsB937Gjme9w/bluearea_estimates_2019.csv")
```

2. From which type of visualization could the students estimate a fraction most accurately? Explore this by visualizing the results in https://syncandshare.lrz.de/getlink/fiGSnqGds4DsB937Gjme9w/bluearea_estimates_2019.csv or the data of your cohort, if the data is already available,

- (a) visualize the data in several ways
- (b) check whether you should preprocess the data in some ways
- (c) discuss what to do with outliers
- (d) calculate mean values and standard deviations and interpret them appropriately
- (e) explore how the result depends on how you measure the error

3. The file `swarth1.txt` contains beak lengths of Darwin finches (species *Geospiza fortis*) from three Galapagos islands¹ Compute mean, standard deviation, median, 25% quantile, and 75% quantile...

- (a) ... for the entire sample and...
- (b) ... separately for each island.

Hint: Read the data into R with the following command:

```
data <- read.table("https://cms-cdn.lmu.de/media/19-biologie/fakultaetswebsite-biologie/downloads/evolutionsbiologie/statgen/statees/swarth1.txt", h=TRUE)
```

¹H.S. Swarth (1931) The avifauna of the Galapagos Islands. *Oct. Paper Calif. Acad. Sci.*

4. With the data from exercise 3 draw histograms and boxplots...
 - (a) ... for the entire sample and...
 - (b) ... separately for each island.
 - (c) Draw density polygons to compare the beak length distributions on the different islands.
 - (d) Describe your observations in one or two sentences.