

Exercise Sheet 2

Fall 2023

Exercise 1: [Descriptive statistics]

Load `spring.ods` (as described in the textbook). The file is available in the Canvas page

- Compute the arithmetic mean, standard deviation, covariance and correlation using a spreadsheet AND a python script (or another programming/scripting language).
- Discuss the advantages and disadvantages with the spreadsheet versus the alternative coding approach. **Post some points from your discussion in the discussion forum on the canvas page** (you will not see posts from the other students until you have posted something yourself)

Exercise 2: [Linear regression]

Load temperature data («temperatur» and «lufttemperatur») from [ektedata.no](http://www.ektedata.no/no/innhold/utvalg-av-data) <http://www.ektedata.no/no/innhold/utvalg-av-data>

Data: «Alle målinger» 21/08/2016 - 22/08/2016

- Plot the air-temperature and the water surface temperature (0.5m) in the same plot (as a function of time).
- Plot air-temperature against water surface temperature (0.5m)
- Create and plot a regression line. You can use the formulas from the lectures or a regression package/software.
- Based on the plot. Is it reasonable to assume that there is a linear relation between air and water temperature?
- What is the slope of the regression line? How do you interpret the sign of the slope? (i.e. in what situations do we have a positive and negative slope?)
- Based on your physics knowledge. Is it reasonable to assume that there is a linear relation between air and water temperature?

Exercise 3:

Load temperature data from Svalbard lufthavn from the file `svalbard_met.csv` (open data from Meteorologisk institutt (MET))

- a) Use linear regression to determine the linear trend in the data from 1898 to 2023.
- b) What is the slope of the regression line?
- c) Is a linear model applicable in this situation? Discuss.