

Homework assignment 2 – Mathematical Statistics

Because there is some R involved, students should hand in the answers via an assignment on canvas. Deadline is September 21 at 9 am.

For $\alpha > 0$, consider the p.d.f.

$$f(x) = \begin{cases} \frac{\alpha}{x^{\alpha+1}} & \text{for } x \geq 1 \\ 0 & \text{for } x < 1 \end{cases}$$

- (a) Compute the quantile function of the distribution with this p.d.f.
- (b) For which values of α does the skewness exist? If it exists compute a closed-form expression depending on α . (Any expression only based on α works, no need to simplify it!)

Work with the dataset `Cholera.csv` and write your answers in an R script. You can include this script with the other files within one pdf file (you can check out the lecture notes how to include R code in a pdf).

- (c) Select all the rows in the data that correspond to the year 1960.
- (d) Make a histogram of all cholera numbers reported for 1980.
- (e) Now take the logarithm of the cholera numbers for the year 1980 and make a histogram of those. Add the density of a normal density with mean and variance matching the mean and the variance of the data. Is the normal distribution a good fit?

Grading:	a	b	c	d	e	Total
	2	3	1	1	3	10