



# Introduction to Mathematical Software

## 1st exercise sheet

**Exercise 1 (First steps)** Direct your web browser to the information page for this course and look at the literature section. Get an idea of the online documentation for Linux mentioned there. See what KNOPPIX is.

### Exercise 2 (Searching and file handling)

- Find out what the command `less` is good for. (*Hint*: What does the command `man` do?) Then download the “textfile” from the materials section of the web page for this course and save it to your home directory. Look into it with `less`. Finally create a directory named “exercise0” and move the textfile into it using the `mv` command.
- Get an idea of what the command `fgrep` does. Then change to the `exercise0` directory and find all lines of the textfile containing a capital letter X. Save the result to a file called “lines\_X”. Now find all lines of the textfile containing a capital X as well as a small letter x and save the result to “lines\_Xx”. How many lines of the textfile contain a capital X but no small letter x?
- Make a backup copy of the textfile using the `cp` command. Then delete all lines from the textfile containing the strings “network” or “Network”.
- Make a backup of the whole directory “exercise0”, then delete it with all its content using the commands `rm` or `rmdir`.
- Use your knowledge about `less` to find out how often the string “byte” occurs in the manpage for `fgrep`.

### Exercise 3 (Maple)

Start Maple by using the `xmaple` command.

- Take the Ten Minute Tour by clicking *Help* → *Take a Tour of Maple* → *Ten Minute Tour*.
- Let Maple calculate the following expressions for you.

$$\frac{2}{5} + \frac{7}{11}$$

$$\frac{1}{\sqrt{3}} \sin\left(\frac{\pi}{3}\right)$$

$$\int_0^{\pi} \frac{x^2}{x+1} dx$$

- Find out which of the following numbers are prime numbers: 107, 96199, 2497145999, 717171117111117, 7373737373737, 737373737373737
- Find out which of the following numbers are factorials: 720, 4320, 39916800, 25852016738884976640000, 26976017466662584320000
- Find out by searching the internet what “perfect number” means. Then decide which of the following numbers are perfect: 28, 120, 496, 8192, 13164036458569648337239753460458722910223472318386943117783728128