

## Exercise Sheet 6

### Exercise 20

Use exercise 11 (biometric access system) and compute the 99% confidence interval. How many access trials are necessary in order to judge the access system with the given CI with a 2% accuracy? Determine the number of simulations for an adequate accuracy and graphically visualize the confidence interval in dependency of the access trials.

### Exercise 21

The amount of vegetarians in a population is to be estimated with 90% confidence and 2% accuracy. What is the necessary sample size? If you double the accuracy (i.e. a maximum deviation of 1%), how does this affect the necessary sample size?

### Exercise 22

A company fills bottles with a nominal value of  $1000\text{ml}$  and an actual filling quantity being a normal distributed random variable with a standard deviation of  $3\text{ml}$ . A sample of  $N = 50$  resulted in a sample mean of  $\bar{x} = 999\text{ml}$ . Compute the confidence interval with 95% confidence for the true mean of the filling plant. Can one conclude from the result that the plant is filling the bottles on average insufficiently? For this CI, you need to decide, which of the two CIs for expectations you will employ.