

Homework Stochastic Simulation (2017) - Second set

The deadline of this homework set is Friday November 10 at 15:00. For the programming exercises, you are free to use any programming language or mathematical software package (Maple/Matlab/Mathematica/R/anything) as long as you

- include all code in your deliverables, and
- for random number generation purposes, you use standard built-in methods to generate standard uniform samples. For generating samples from any other distribution, you'll have to construct them yourself using the standard uniform samples.

Please compile answers and code in a single PDF document, and send it by e-mail to Jan-Pieter Dorsman (j.l.dorsman 'at' uva...).

Should you have any questions about the homework exercises, please reach out to one of the lecturers during the lecture.

Exercise 1 Make exercise III.1.1 of [AG].

Exercise 2 Make exercise III.1.2 of [AG].

Exercise 3 Make exercise III.1.3 of [AG].

Exercise 4 Make exercise III.3.1 of [AG]. Read s^2 as the sample variance, just like \hat{z} represents the sample mean.

Exercise 5 Consider the second discrete-event simulation example that was discussed in the third lecture (i.e. the bank example or the M/G/c queueing model). However, we now let go of the assumption that the bank is open for 7 hours, but instead we assume that the bank is open 24 hours a day, 7 hours a week. We are interested in the average queue length in the long run of this model.

- Discuss how the regenerative method can be applied and the simulation program can be adapted so as to obtain a 95% confidence interval for the average queue length.
- Discuss how the method of batch means can be applied and the simulation program can be adapted so as to obtain a 95% confidence interval for the average queue length.
- Implement any of these two methods in the simulation program, and present the confidence interval obtained.