Lab 1 - due 23:59 Wednesday 21 February 2018

February 14, 2018
References in your solutions

Please add references to any external material that you base your answers on.

Please upload your solution at https://courses.cs.ut.ee/2018/isc/spring

This is a 3 ECTS course = 3 × 26 hours = 78 hours ≈ 4 hours in class and lab, 6 hours independent preparation per week.

Study material


- Secik “Fractal analysis of Pi normality” Experimental Mathematics (2017)
  https://doi.org/10.1080/10586458.2017.1279092

Problems

Homework question 1
Using any software you like, make plots for values of \( n = 2, 4, 8, 16 \) to show that for \( 0 \leq t \leq 2 \)

\[
\lim_{n \to \infty} \left[ \prod_{i=0}^{n} \left( 1 + \frac{rt}{n} \right) \right] = \exp(rt)
\]

that is

a) On one set of axes, make 4 plots of \( \prod_{i=0}^{n} \left( 1 + \frac{rt}{n} \right) \) against \( t \) for \( r = 0.1 \) and \( n = 2, 4, 8, 16 \) and one further plot of \( \exp(rt) \)

b) On a second set of axes, make 4 plots of \( \prod_{i=0}^{n} \left( 1 + \frac{rt}{n} \right) - \exp(rt) \) against \( t \) for \( r = 0.1 \) and \( n = 2, 4, 8, 16 \).

Homework question 2
Solomon chapter 1, question 1.1.

Homework question 3
Solomon chapter 1, question 1.2.

Homework question 4
Solomon chapter 1, question 1.5.

Homework question 5
Solomon chapter 1, question 1.15.

Homework question 6
Solomon chapter 1, question 1.16.
Homework question 7
Summarize Secik's article. Be sure to be ready to explain what parts are new to you in class.

Homework question 8
What programming languages have you used and which ones do you want to learn more about?

Homework question 9
How long did this take you?