

4th February, 2025

STK-4051 / STK-9051

Mandatory assignment 1 of 2

Submission deadline

Thursday 20th of February 2025, 14:30 at Canvas.

Instructions

Note that you have **one attempt** to pass the assignment. This means that there are no second attempts.

You can choose between scanning handwritten notes or using a typesetting software for mathematics (e.g. LaTeX). Scanned pages must be clearly legible. The assignment must be submitted as a single PDF file. Remember to include any relevant programming code and resulting plots and figures, in the PDF-file.

All aids, including collaboration, are allowed, but the submission must be written by you and reflect your understanding of the subject. If we doubt that you have understood the content you have handed in, you may be asked to give an oral account.

Application for postponed delivery

If you experience technical problems, or need a postponement of the deadline, you must contact the student administration at the Department of Mathematics no later than the same day as the deadline: studieinfo@math.uio.no Note that teaching staff can not grant extensions.

All mandatory assignments in this course must be approved in the same semester, before you are allowed to take the final examination.

[Read the department's guidelines for mandatory assignments for more information.](#)

GOOD LUCK!

Problem 1. (Exercise 2.8 of [Givens & Hoeting, 2013](#))

Recall that for a two-dimensional problem, the Nelder–Mead algorithm maintains at each iteration a set of three possible solutions defining the vertices of a simplex, specifically a triangle.

Let us consider whether three is a good choice. Imagine an algorithm for two-dimensional optimization that maintains four points defining the vertices of a convex quadrilateral and is similar to Nelder–Mead in spirit. Speculate how such a procedure could proceed. Consider sketches like those shown in Figure 2.10 of [Givens & Hoeting \(2013\)](#). What are some of the inherent challenges?

Bibliography

GIVENS, G. H. & HOETING, J. A. (2013). *Computational Statistics*. Wiley.