

BENCHOP as a Service

The BENCHOP project (<http://www.it.uu.se/research/project/compfin/benchop/>) is a large, international collaborative project initiated by the Computational Finance research group (http://www.it.uu.se/research/scientific_computing/project/compfin) at the Division of Scientific Computing. BENCHOP aims at defining a standard benchmark to compare existing and new numerical methods for option pricing. The codes are all implemented in MATLAB, a commercial software frequently used in computational science.

To that end, six test problem were defined, and 15 numerical methods for their solution implemented (for details see <http://uu.diva-portal.org/smash/get/diva2:848689/FULLTEXT01.pdf>). The current benchmark is provided in the file BenChop.zip, distributed via the student portal, and the entry point to running all the codes is explained in the contained readme.txt.

Your task is now to develop a cloud service to support users in running/using the benchmark. It is not possible for us to use MATLAB in the course/cloud environment due to licensing issues. Instead, you can use GNU Octave (<https://www.gnu.org/software/octave/>), an open source implementation of the Matlab programming language.

Examples of questions that you can choose to focus on:

- Can you speed up the evaluation of the benchmark by running different solvers in parallel in the backend?
- Can you make a REST API/interface that makes it possible to recompute the benchmark for e.g. the problem “1a” but for different sets of parameters? Does the ranking of the methods change?
- Can you automate the process of uploading a new method that solves one of the test problems, evaluating it and providing information on what other methods it is more or less efficient than?
- The performance of a program always depends on the hardware and software environment it is executed in. To what degree depends on the particular code.

Will the relative ranking of methods in the original BENCHOP stay the same on different instance flavors?

Practical tips:

- The script Table.m takes a very long time to complete. Try to isolate and run some of the methods in the paper with short run-time to make sure you have things figured out and working.
- Docker containers can be a very convenient way to package up the applications and associated codes. They have the advantage that they can run in a lightweight way also outside the cloud environment.