

Numerical Methods 1 – laboratory rules, information and schedule

(summer semester 2022/2023)

I. MATLAB (meetings 1-7)

Topics to be considered:

- Matrix, vector and array operations,
- Functions and program flow,
- 2D plots.

For solving (programming) small exercises during classes a student may collect (in total) up to 9 points.

II. Numerical Methods Project (meetings 8-14)

Schedule:

- meeting 8 — Assigning Project Task
- meeting 9 — Presentation of program specification and discussion on the future solution (subgroup A)
- meeting 10 — Presentation of program specification and discussion on the future solution (subgroup B)
- meetings 11 — Presentation of Matlab programs (subgroup A)
- meetings 12 — Presentation of Matlab programs (subgroup B)
- meetings 13 — Presentation of reports (subgroup A)
- meetings 14 — Presentation of reports (subgroup B)
- meeting 15 — Final classification

The points for Project task may be obtained from:

- task specification (a header of a main Matlab function with detailed description of all arguments): **0-2** points,
- testing functions: **0-4** points,
- program: **0-6** points,
- report (short mathematical description of methods used and numerical tests descriptions and results): **0-6** points.

All programs and testing functions should be written in Matlab. Programs are graded mostly based on their features related to numerical methods (a correct and working algorithm), however (in)effectiveness of the code or lack of comments or description of functions' parameters, or a code that is not esthetic may result in loss of **1-3** points.

Testing functions should convince a teacher that a students' program is correct and works precisely according to its specification.

Task specification shows the teacher that student understands her/his task. If specification is not correct it will be modified during the discussion with a teacher. Some points for the specification will be lost in such a case, however a chance that a students delivers a correct program greatly increases.

Report should consist of about three A4 pages. It should include: student's personal data (first name, last name, index number), task number, a short description of the task, short mathematical description of numerical methods used, presentation of numerical examples to be tested, presentation of the results in the form of **tables or graphs**, and very short conclusions. Incomplete reports or reports where results are simply copied and pasted from Matlab workspace will not be graded.

Please note the difference between the numerical tests (described in a report) from the tests that show that a student's program works correctly. Numerical tests verify the quality of a method (e.g. if the method is accurate or fast — they test the method, not the program), while the correctness tests should show (using elementary examples) that the program computes results exactly as it should.

Solutions must be delivered in a way specified by the laboratory teacher. Details and all deadlines will be provided by the teacher.

Important: all programs should work properly under the 2022a version of Matlab with no toolboxes or additional libraries installed.

Very important note. A student must complete each laboratory exercise by her/himself. Students should not work in groups or base their solutions on programs found in the internet. If a student's program is too similar to the one a teacher can find in the internet, or to the one delivered by another student, then it is assumed that the student has not been working by her/himself. Within four school weeks counting from the day a solution (program or report) is delivered, a teacher may summon a student and interview her/him (in-person or remotely -- the teacher decides) about her/his solution. If it is revealed that the student has not been working by her/himself or the student fails to explain a part of her/his own program (or report), the student obtains 40 penalty points. These points are subtracted from the total number of points collected by the student (from laboratories, tutorials, and knowledge verification test), but they do not cause failure to pass the laboratories.