

# Applied mathematics

February 8, 2026

## Topics

1. Floating point systems (properties, rounding, errors)
2. Systems of linear equation with error in the right-hand side, matrix norms, condition number.
3. Numerical solution of linear systems (LU,PLU,Cholesky)
4. Least square approximation.
5. Polynomial interpolation (Lagrange, Hermite, spline)
6. Numerical integration.
7. Eigenvalue problems, sparse systems.
8. Numerical solution of nonlinear equations and systems, minimization.
9. Linear programming (graphical and 1,2-phase simplex method) Duality in linear programming, sensitivity analysis. Algorithms for solving transportation and assignment problems.

# Requirements for the grade:

- At most 3 absences from labors. At most 3 absences from practices. Note that the practice is *mandatory*.
- There will be a grading test at the end of the study period, and it will consist numerical/multiple choice/matlab questions. The test's result will be a *percentage*. The grade will be determined by the following evaluation system:
  - 1: 0% – 50%
  - 2: 50% – 70%
  - 3: 70% – 85%
  - 4: 85% – 95%
  - 5: 95% – 100%
- The exact date of the test will be announced on the e-learning site.
- The retake will be held in the exam period.
- The sample test collections on the e-learning site, serve as basis for the grading test.
- During the study period at the time of *practices* there will be some extra tests. The points obtained by these tests can be used to increase your grading test's result.