

MATH-250

Advanced numerical analysis I

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Cursus	Sem.	Type
Mathematics	BA4	Obl.

Language of teaching	English
Credits	5
Session	Summer
Semester	Spring
Exam	Written
Workload	150h
Weeks	14
Hours	4 weekly
Lecture	2 weekly
Exercises	2 weekly
Number of positions	

Summary

Construction and analysis of numerical methods for the solution of problems from linear algebra, integration, approximation, and differentiation.

Content

Representation of numbers on computers
 Interpolation, numerical integration, and differentiation
 Direct and iterative methods for the solution of large systems of equations
 Fourier transform and data compression

Keywords

numerical algorithms
 numerical linear algebra

Learning Prerequisites**Required courses**

Analysis I and II
 Linear Algebra

Recommended courses

Elements of scientific programming

Learning Outcomes

By the end of the course, the student must be able to:

- Choose a convenient method to solve a specific problem
- Interpret the computational results in view of the existing theory
- Estimate numerical errors
- Apply numerical algorithms to solve specific problems

Transversal skills

- Use a work methodology appropriate to the task.
- Give feedback (critique) in an appropriate fashion.
- Use both general and domain specific IT resources and tools
- Access and evaluate appropriate sources of information.

Teaching methods

Ex cathedra lectures and exercises in the classroom and on the computer

Expected student activities

Attendance of lectures
Doing exercises and homeworks
Implementing simple programming tools
Solving basic applied mathematics problems

Assessment methods

Form of examination:
17% project or homework. 83% exam.

Resources

Bibliography

Detailed lecture notes accompanying the course will be provided.

Moodle Link

- <https://go.epfl.ch/MATH-250>