Analyse numérique

Lecturer
Artem NAPOV (Coordinator)

Course mnemonic
MATH-H202

ECTS credits
4 credits

Language(s) of instruction
French

Course period
Second term

Campus
Solbosch

Course content

Floating point representation and arithmetic. Stability and conditioning. Systems of linear equations : conditioning, direct and iterative methods. Overdetermined systems and QR factorization. Nonlinear equations and systems of nonlinear equations. Interpolation and approximation of functions. Numerical integration. Ordinary differential equations (ODEs) and systems of ODEs : initial and boundary value problems.

Objectives (and/or specific learning outcomes)

Give a basic overview of different areas of numerical analysis, corresponding problems and numerical algorithms used to solve these problems. Practical aspects are explored with the help of GNU Octave software (an open source clone of Matlab).

Pre-requisits and co-requisits

Pre-requisites courses

MATH-H1002 | Analyse I | 5 crédits

Co-requisites courses

MATH-H1003 | Algèbre linéaire et géométrie | 8 crédits

Teaching method and learning activities

Theory is exposed during the lectures. Students explore the practical aspects during the class hours (using Octave software in a computer laboratory).

References, bibliography and recommended reading

1) A Quarteroni, R Sacco, F Saleri, *Méthodes numériques: algorithmes, analyse et applications*, Springer.

2) Lloyd N. Trefethen, David Bau, III, *Numerical Linear Algebra*, SIAM.

3) Uri Ascher and Chen Greif, *A First Course in Numerical Methods*, SIAM.

Other information

Place(s) of teaching

Solbosch

Contact(s)

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Evaluation method(s)

written examination

Evaluation method(s) (additional information)

A written examination at the computer laboratory, covering theoretical and (mainly) practical aspects.

Determination of the mark (including the weighting of partial marks)

The course mark is the written examination mark.

Main language(s) of evaluation

French

Programmes

Programmes proposing this course at the Brussels School of Engineering

BA-IRCI | Bachelor in Engineering Sciences | option Bruxelles/unit 2