COURSE DETAIL

NUMERICAL METHODS FOR DIFFERENTIAL EQUATIONS
Country Sweden
Host Institution Lund University
Program(s) Lund University
UCEAP Course Level Upper Division
UCEAP Subject Area(s) Mathematics Engineering
UCEAP Course Number 115
UCEAP Course Suffix
UCEAP Official Title NUMERICAL METHODS FOR DIFFERENTIAL EQUATIONS
UCEAP Transcript Title NUM METH DIFF EQUAT
UCEAP Quarter Units 6.50
UCEAP Semester Units 4.30

Course Description
This course analyzes numerical methods for ordinary and partial differential equations which include the construction, analysis, and application of basic algorithms. The course incorporates other methods such as Newton or the solution of sparse linear systems, which are explained in the context where they are applied. Scientific computing is a vital part of the course. The course covers methods for time integration including Euler's method and the trapezoidal rule. The course also explores multistep methods including Adams methods and backward differentiation formulae. Other course topics include: explicit and implicit Runge-Kutta methods, error analysis, stability and convergence, stiff problems and A-stability, error control and adaptivity, and differential algebraic systems. The course also examines the Poisson equation and discusses finite differences, the finite element method, and multigrid. The course studies time dependent PDEs, including numerical schemes for the diffusion equation. The course includes an introduction to finite volume schemes for conservation laws.

Language(s) of Instruction
English

Host Institution Course Number
FMNN10/NUMN12

Host Institution Course Title
NUMERICAL METHODS FOR DIFFERENTIAL EQUATIONS

Host Institution Course Details
https://kurser.lth.se/lot/course/FMNN10

Host Institution Campus
Lund

Host Institution Faculty
Science/Engineering

Host Institution Degree

Host Institution Department

Course Last Reviewed
2024-2025

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