SF1634 Differential Equations II 9.0 credits

Differentialekvationer II

This is a translation of the Swedish, legally binding, course syllabus.

If the course is discontinued, students may request to be examined during the following two academic years

Establishment

Course syllabus for SF1634 valid from Spring 2017

Grading scale

A, B, C, D, E, FX, F

Education cycle

First cycle

Main field of study

Mathematics,Technology

Specific prerequisites

SF1624/SF1663/SF1666/SF1667/SF1675 + SF1625/SF1664/SF1668 + SF1626/SF1665/SF669 or corresponding courses.

Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

Intended learning outcomes

After passing the course the students should

- have basic knowledge of the theory of ordinary differential equations (ODE),
- be able to solve some types of (systems of) ODEs with standad methods,
- -be able to examine (systems of) ODEs with elementary geometric and with qualitative methods,
- be able to determine Fourier and Laplacetransforms,
- be able to determine the Fourier series representation of periodic continuous-time signals,
- be able to solve separable partial differential equations and determine solutions to boundary value problems with Fourier and transform methods,
- be prepared for deeper studies in fields relevant for their future education,
- be able to use relevant software for solving problems of the type mentioned above with symbolic as well as with geometric methods,
- be able to apply this knowledge of modelling problems.

Course contents

ODEs of order 1: Basic notions and theory. Modelling. Direction fields and solution curves. Autonomous equations, stationary solutions and their stability. Separable equations. Linear equations.

ODEs of higher order: Basic teori. Methods for solving linear equations with constant coefficients. Oscillations.

Systems of linear ODEs: Basic notions and theory. The eigenvector method (homogenuous linear systems), The method of variation of parameters (particular solutions of nonhomogenuous linear systems).

Generalized functions as a tool to represent signals.

The Laplace transform with applications.

Fourier series and Fourier transforms with applications.

Linear partial differential equations: Separation of variables. Solution of some classical equations (the wave equation, the heat equation, the Laplace equation) with transform methods.

Course literature

Zill-Cullen/Differential Equations with Boundary-Value Problems

Råde-Westergren/Mathematics Handbook for Science and Engineering.

Examination

- INLA - Assignments, 3.0 credits, grading scale: P, F
- TENA - Examination, 6.0 credits, grading scale: A, B, C, D, E, FX, F

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

Other requirements for final grade

(TEN1, 6 cr). One examination test,
(INL1, 3 cr), One report.

Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.