DN2269 Mathematical Models, Analysis and Simulation, part 2 7.5 credits

Matematiska modeller, analys och simulering, del 2

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

Establishment

Course syllabus for DN2269 valid from Autumn 2007

Grading scale

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

Education cycle

Second cycle

Main field of study

Mathematics

Specific prerequisites

One of the courses 2D1220/DN2220 Applied Numerical Methods I, 2D1225/DN2225 Numerical Solutions of Differential Equations, 2D1250/DN2250 Applied Numerical Methods II.. Some experience of computer programming and the use of UNIX systems or personal computers is also assumed. The course DN2269 Mathematical models, analysis and simulation, part II can be studied independently of course 2D1266/DN2266 Mathematical models, analysis and simulation, part I.

Language of instruction

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

Intended learning outcomes

The goal of the course is to

- expose the students to and give them experience of important parts of applied and numerical mathematics,

so that they will be able to

- analyze systems with infinite degrees of freedom both theoretically and computationally.

Course contents

Can vary from year to year.

In 03/04 the course treated stochastic differential equations and their numerical solution, with applications in financial mathematics, turbulent diffusion, control theory and Monte Carlo methods. We discussed basic questions for solving stochastic differential equations, e.g. to determine the price of an option is it more efficient to solve the deterministic Black and Scholes partial differential equation or use a Monte Carlo method based on stochastics.

The course treated basic theory of stochastic differential equations including weak and strong approximation, efficient numerical methods and error estimates, the relation between stochastic differential equations and partial differential equations, stochastic partial differential equations, variance reduction.

Course literature

To be announced at course start. Previous year material produced at the department was used.

Examination

- TEN1 - Examination, 3.8 credits, grading scale: A, B, C, D, E, FX, F
- LAB1 - Laboratory Task, 3.7 credits, grading scale: P, 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.

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

Other requirements for final grade

Examination (TEN1; 3,8 university credits).
Assignments (LAB1; 3,7 university credits).

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.