DN2230 Fast Numerical Algorithms for Large-Scale Problems 7.5 credits

Snabba numeriska algoritmer för storskaliga problem

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

Establishment

Course syllabus for DN2230 valid from Autumn 2009

Grading scale

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

Education cycle

Second cycle

Main field of study

Specific prerequisites

Single course students: 90 university credits including 45 university credits in Mathematics or Information Technology. English B, or equivalent.

Language of instruction

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

Intended learning outcomes

After having completed the course the student will understand general construction principles of fast numerical algorithms for large-scale problems, their properties and areas of applications. The student should be able to select, develop, and apply such methods in practical problems.

After the course you will be able to

- analyze the specific properties relevant to the numerical solution of large-scale problems such that you can select and modify appropriately corresponding numerical methods;
- analyze and follow the relevant research literature;
- perform such computations, estimate the necesary computer resources, and judge the quality of the results; and
- develop and implement algorithms adapted to a given problem starting from general construction principles.

Course contents

Fast multipole methods (FMM)

Krylov-type iteration methods for unsymmetric and nonlinear problems

Advanced topics in multigrid methods, hierarchical matrices

Wavelet methods

Course literature

Course literature will be announced at least 4 weeks before course start at course web page.

Examination

- HEM1 - Exercises, 4.0 credits, grading scale: P, F
- TEN1 - Examination, 3.5 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.

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

In this course all the regulations of the code of honor at the School of Computer science and Communication apply, see: http://www.kth.se/csc/student/hederskodex/1.17237?l=en_UK.

Other requirements for final grade

Homework (LAB1; 3,75 cr)
Written examination (TEN1; 3,75 cr)

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.