FSF3582 Inverse Problems 7.5 credits

Inversa problem

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

Establishment

Course syllabus for FSF3582 valid from Spring 2019

Grading scale

G

Education cycle

Third cycle

Specific prerequisites

A Master degree including at least 30 university credits (hp) in Mathematics (including differential equations, functional analysis and numerical analysis).

Language of instruction

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

Intended learning outcomes

After the course the students are expected to understand basic mathematical and numerical methods to solve inverse problems related to partial differential equations.

Course contents

Some topics: ill-posed problems and their numerical solution by regularization methods, regularization of linear problems, Tikhonov regularization, regularization of non linear problems.

Some applications: differentation as an invers problem, X-ray tomography, data-assimilation for weather and climate prediction, inverse scattering, optimal design, image processing, parameter identification.

Disposition

Lectures and seminars

Course literature

- (Main course book) Heinz W. Engl, Martin Hanke, Andreas Neubauer, Regulation of Invers Problems, Kluwer Academic Publishers, 2000, ISBN 0-7923-6140-7 (paperback ~$40), 0-7923-4157-0 (cloth ~$200);
- Curtis R. Vogel, Computational Methods for Inverse Problems, the Society for Industrial and Applied Mathematics, 2002.

Examination

- INL1 - Assignment, 7.5 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.

Home assignments

Written exam

Other requirements for final grade

Home assignments completed
Written exam completed

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.