FSF3620 Homogenization, Oscillation and Randomness in PDE and FBP 7.5 credits

Homogenisering, oscillering i PDE och FBP

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 FSF3620 valid from Autumn 2009

Grading scale

Education cycle

Third cycle

Specific prerequisites

A Master degree including at least 30 university credits (hp) in in Mathematics. Basic knowledge in functional analysis, and introductory pde.

Language of instruction

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

Intended learning outcomes

After completing the course, students should have a good understanding of the basic of classical homogenization and oscillation (about random media). The core application will be towards free boundary problems.

Course contents

- Basic tools: L^p spaces, (weak) convergences, periodic functions, Sobolev spaces,
- Basic PDE: Existence theory, viscosity solutions, variational formulation,
- Basic FBP: Obstacle problem, weak and variational form, Flame propagations,
- Physical models in homogenization,
- Methods of homogenizations: Multi-scale method, oscilating test function, two-scale method, correctors,
- Periodic, non-periodic, and random homogenization (articles)

Disposition

Lectures and presentation.

Course literature

i) An introduction to homogenization, by Doina Cioranescu & Patrizia Donato.

ii) Artiklar

Examination

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.

A written report and presentation/oral exam. 2h presentation of a topic chosen by the course leader. has to be submitted.

Other requirements for final grade

Approved homework assignments, and presentation/oral examination

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.