FSF3708 Computational Algebraic Geometry 7.5 credits

Beräkningar i algebraisk geometri

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 FSF3708 valid from Autumn 2014

Grading scale

Education cycle

Third cycle

Specific prerequisites

PhD students with sufficient knowledge in algebraic geometry and commutative algebra.

Language of instruction

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

Intended learning outcomes

The overall aim is to develop the computational skills within algebraic geometry among the participants.

At the end of the course the students should be able to:

- Use implicitization to compute the defining equations of a variety given as the image of a map.
- Compute the presentaion of the associated graded algebra of a local ring.
- Compute blow-ups of projective varieties along smooth subvarieties
- Use standard pairs for integer programming problems
- Make computations in the Hilbert scheme of low degree Hilbert polynomials
- Compute stabilzers of monomial ideals
- Use eliminants and eigenvalue techniques to find the solutions to polynomial systems of equations.
- Write a package in Macaulay2 including documentation which makes it possible for others to use the code written in a project within a specialized area.

Course contents

Computational methods in algebraic geometry, including for example implicitization and blow-ups.

Disposition

The first part of the course is organized in form of a series of lectures with homework. The second part is based on project work with weekly presentations on the progress of the projects.

Course literature

Computations in algebraic geometry with Macaulay 2 by David Eisen bud, et al.

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.

Homework and project work with oral presentation.

Other requirements for final grade

Homework and project work with oral presentation

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.