



SF2842 Geometric Control Theory 7.5 credits

Geometrisk styrteori

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

Establishment

The course syllabus is valid from Spring 2022 according to the school principal's decision: S-2022-0529 Decision date: 2022-02-24

Grading scale

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

Education cycle

Second cycle

Main field of study

Mathematics

Specific prerequisites

English B / English 6

In general:

150 university credits (hp) including 28 hp in Mathematics, 6 hp in Mathematical Statistics and 6 hp in Control Theory. Documented proficiency in English corresponding to English B.

More precisely for KTH students:

Passed courses in calculus, linear algebra, differential equations, mathematical statistics, numerical analysis, control theory. A passed course in mathematical systems theory (SF2832) is an advantage.

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 shall be able to:

- Interpret and explain basic properties of linear systems from a geometric perspective.
- Apply different algorithms to solve control problems such as DDP, non-interacting control, tracking and output regulation.
- Solve some basic control problems for nonlinear systems that do not have a controllable linearized system.

In addition, for the highest grade the student shall be able to:

- Solve simple but realistic control problems that require synthesis of different design algorithms.

Course contents

- Invariance and controlled invariance
- V^* and disturbance decoupling
- Zeros, Zero dynamics and system inversion
- Tracking and non-interacting control
- Input-output behavior
- Output regulation, Internal model principle
- Nonlinear systems

Examination

- HEM2 - Home assignments, 1.5 credits, grading scale: P, F
- TEN2 - Written exam, 6.0 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.

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.