SF1628 Complex Analysis 6.0 credits

Komplex analys

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

Establishment

Course syllabus for SF1628 valid from Autumn 2007

Grading scale

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

Education cycle

First cycle

Main field of study

Mathematics, Technology

Specific prerequisites

Calculus, introductory courses, SF1602 + SF1603 and SF1604 Linear Algebra.

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 student should be able to

- Understand, interpret and use the basic concepts: complex number, analytic function, harmonic function, Taylor and Laurent series, singularity, residue, conformal mapping, meromorphic function.
- Prove certain fundamental theorems about analytic functions, e.g. Cauchy's integral formula
- Determine the stability of certain dynamical systems using the Nyqvist criterion
- Use conformal mapping to solve certain applied problems regarding heat conduction, electrical engineering and fluid mechanics.
- Use Taylor and Laurent expansions to derive properties of analytic and meromorphic functions.
- Compute integrals by means of residues.
- Analyze zeros and poles of meromorphic functions, classify singularities.

In order to get a higher the student should also be able to

- Explain the theory of analytic functions and prove the most important theorems.

Course contents

- Meromorphic and analytic functions of one complex variable. Basic transcendental functions, harmonic functions.
- Integration in the complex plane, Cauchy's theorem, Cauchy's integral formula and consequences thereof. Residues.
- Taylor and Laurent series, zeros and poles, the principle of the argument.
- Conformal mapping and applications.

Course literature

Wunsch: Complex Variables with Applications, 3:rd ed.

Examination

- TEN1 - Examination, 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.

Other requirements for final grade

Written and/or oral examination, possibly in conjunction with certain other assignments.

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.