Applied Transform Theory

Programme course

6 credits

Tillämpad transformteori

TNG032

Valid from: 2017 Spring semester

Determined by
Board of Studies for Electrical Engineering,
Physics and Mathematics

Date determined
2017-01-25

Main field of study

Mathematics, Applied Mathematics

Course level

First cycle

Advancement level

G2X

Course offered for

- Electronics Design Engineering, M Sc in Engineering
- Communication and Transportation Engineering, M Sc in Engineering
- Media Technology and Engineering, M Sc in Engineering

Entry requirements

Note: Admission requirements for non-programme students usually also include admission requirements for the programme and threshold requirements for progression within the programme, or corresponding.

Prerequisites

Single variable calculus, Linear Algebra, Multi variable calculus

Intended learning outcomes

To give the students the mathematical background in transformtheory needed in Circuit Theory, Control Theory, Image Processing and Signals and Systems. Students will be expected to be able to do the following after completing this course:

- utilize and determine Fourierseries, use Parsevals identity, use basic convergence results
- transform functions and sequences using Fourier-, Laplace- and Z-transform, have knowledge about what function and sequences can be transformed, and the properties of the transformed function and sequences.

- use transforms and Fourier series to solve e.g. ordinary differential equations, partial differential equations, difference equations, integral equations.
- have the ability to write a technical report in English, give an oral presentation of results, and critically examine and discuss other students' oral and written presentations.

Course content

We will study some important transform methods: Fourier series, Fourier transforms, Laplacetransforms, and z-transforms, together with some of their applications.

One of the laboratory exercises requires a written report, an oral presentation and opposition in English. These learning activities will help students improve language skills, presentation techniques and opposition in English as well as the ability to adapt a presentation to a specific audience.

Teaching and working methods

The course is given in the form of lectures, tutorials and lab exercises.

Examination

UPG1	Written report, oral presentation and opposition	U, G	1 credits
KTR1	Optional written test	U, G	0 credits
LAB3	Laboratory work	U, G	1 credits
TEN3	Written examination	U, 3, 4, 5	4 credits

The laboratory part of the course consists of labs chosen from image processing, control techniques and signal processing. The programming language is Matlab. Support, review and feedback will be given by language teachers in conjunction with report writing and oral presentation / opposition in English.

Grades

Four-grade scale, LiU, U, 3, 4, 5

Department

Institutionen för teknik och naturvetenskap

Director of Studies or equivalent

George Baravdish

Examiner

Zhuangwei Liu

Course website and other links

Education components

Preliminary scheduled hours: 58 h
Recommended self-study hours: 102 h

Course literature

Fourier and Laplace transforms, Beerends m.fl., Cambridge University Press.
Problemsamling Laborationssamling

Common rules

Regulations (apply to LiU in its entirety)

The university is a government agency whose operations are regulated by legislation and ordinances, which include the Higher Education Act and the Higher Education Ordinance. In addition to legislation and ordinances, operations are subject to several policy documents. The Linköping University rule book collects currently valid decisions of a regulatory nature taken by the university board, the vice-chancellor and faculty/department boards.

LiU's rule book for education at first-cycle and second-cycle levels is available at http://styrdokument.liu.se/Regelsamling/Innehall/Utbildning_pa_grund-_och_avancerad_niva.