FMF3028 Robust and Probabilistic Design 6.0 credits

Robust och probabilistisk konstruktion

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

Establishment

Official course syllabus of FMF3028 applies from VT2017

Grading scale

P, F

Education cycle

Third cycle

Specific prerequisites

Admitted to third-cycle programmes

Language of instruction

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

Intended learning outcomes

A student who has completed the course should be able to:

• describe characteristic product properties in statistical terms

• estimate the confidence interval for the estimated reliability of a system

• define type of probability distribution for a given amount of data

• describe aim, methodology and result of a statistical experimental design

• create a test plan for a physical and a numerical experiment,

• describe aim and procedure to carry out a Monte Carlo simulation,

• use Monte Carlo simulation to analyse how uncertainty in the model parameters influences the simulation result

• describe the aim for robust design and how the method relates to optimisation methods

• use robust design to decrease the sensitivity of the performance of a product for variations in the parameters of its components

• use robust design to decrease the sensitivity of the performance of a product for variations in the technically interactive parameters of the system

• use robust design to decrease the sensitivity of the interactive performance of a product for variations in the ergonomic parameters of the system.

Course contents

Engineering statistics: Normal, exponential and Weibull distribution, confidence interval.

Statistical experimental design: physical experiments and simulations, censored and suspended test.

Probabilistic design; Monte Carlo simulations (with Matlab and Ansys) of variation of performance caused by variations in design - manufacturing tolerances, material properties, geometric configuration), user (anthropometric data) and environment parameters (humidity, electromagnetic fields, temperature, dirt).

Robust design; minimise performance variations that is caused by variation of design sparameters, human properties and environment conditions.

Examination

• INL1 - Assignment, 6.0 credits, grading scale: P, 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.