Course Analysis MF2024

Robust and probabilistic design VT21

Date and author: 2021-04-18 by Ulf Olofsson

1 Course information

Probabilistic design is an engineering design methodology aimed to produce high-quality products, by systematically studying the effects of variations in design parameters on product performance.

Robust design is a methodology for optimising this quality by making the performance of the product insensitive to variations in the manufacturing, material, operational, and environmental properties.

Course responsible teacher:

Ulf Olofsson

Other teachers in the course:

Edwin Bergstedt and Minghui Tu

Examiner:

Ulf Olofsson

Learning activities:

A student after completed course shall be able to:

describe the characteristic properies of various design characteristics in statistical terms,

assess the confidence interval of the assessed reliability of a technical system,

find the type of probability distribution for a given set of data,

describe the purpose for, the methodology of, and the output from Design of Experiments,

define a testplan for a set of physical and numerical experiments,

describe the purpose and steps for performing a Monte-Carlo simulation.

use Monte Carlo simulations to analyse how the uncertainties in a models input variables affects the results from the model;

describe the purpose of Robust design and how it relates to optimization approaches,

use the Robust design methodology to minimize the sensitivity of a technical response parameter to variations in a set of component design parameters,

use the Robust design methodology to minimize the sensitivity of a technical response parameter to variations i a set of technical interaction parameters,

Additional Comments

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2 Students' view of the course

Summary of students´ view of the course based on for example LEQ survey and/or interviews or other activities.

Response rate of LEQ course evaluation survey:

Feedback from student were given after the individual verbal examination

Brief summary of students' responses from the LEQ survey and/or other types of course evaluation:

Positive feedback on the digital home exam based on exercises more linked to the home assignments. Large differences in workload for the different home assignments. Difficulties to solve all exam questions with the given time slot for the exam. Lack of pre knowledge in basic statics made the course start problemistic.

Additional Comments

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3 Teacher analysis of the course

The analysis should present the development of the quality of the course as well as measures that have been taken after previous course analysis. The course's strengths and weaknesses based on the course evaluation and the teacher's reflection.

Changes of the course before this course offering:

Exam moved to a home exam in canvas followed by a verbal examination. The students were allowed to use matlab and excel to solve the problems similar to the home assignments in the course

The course's strengths (based on the students' experiences and the teacher analysis):

Combination of using robust and probabilistic design tools

Areas for improvement of the course (based on student experiences and teacher analysis)**:**

Basic statistics knowledge differ in the student group – this needs to be handled in the first lectures.

Proposed changes to the next course round:

Add more basic statistics in the first lectures

Additional Comments

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