



HÖGSKOLAN I GÄVLE

Stochastic Processes 7.5 cr

Stokastiska processer 7,5 hp

Set by Board of Mathematics, Natural and Computer Sciences

Version

Set at

Valid from

5/21/08

VT2008

Level	G1F
Education level	First cycle
Course identifier	MA008C
Credits	7.5 cr
Main field of study	Mathematics
Subject group	Mathematics
Disciplinary domain	Natural sciences 100.0 %

Learning outcomes

After finishing this course the student shall be able to:

1. describe the basic concepts, parameters and statistics relating to univariate and multivariate random variables and use such distributions in various stochastic models for real world problems
2. give examples of standard estimators and describe the properties of these
3. describe the basic concepts and statistics relating to random processes in discrete and continuous time and describe some standard processes like the Poisson process and the Wiener process
4. use Fourier analysis for computations regarding the spectral representation of processes
5. give an overview of the theory of linear time invariant filters applied to weakly stationary processes
6. carry out computer assisted calculations and simulations relating to probability and random processes.

Course content

Expectation and probability. Discrete, continuous, univariate and multivariate distributions. Variance and covariance. Independence. Conditional distributions. Jointly Gaussian variables. Least square and maximum likelihood estimators. Convergence of random variables. Stochastic processes, specifications of random processes, independent increments, Markov processes. The Wiener process and the Poisson process. Autocorrelation and cross correlation.

Spectral power density. Convolution and linear time invariant filters. White noise and design of filters.

Teaching

Lectures, tutorials and computer laborations.

Prerequisites

Multivariate calculus B 7,5 credits or a corresponding course and Transform Methods 4 credits (Part 0040, MA007B) or Applied Mathematics for Electrical Engineering 7,5 hp or a corresponding course.

Examination

Examination includes Written examination and Computer laboration.

Grade

A, B, C, D, E, Fx, F

Other regulations

Criteria for final grade will be handed out at the beginning of the course.

Sustainable environment

Content with sustainable development is not relevant to this course.

Module

0010	Written examination	6 cr	Grade: AF
0020	Computer Laboration	1.5 cr	Grade: AF