

STOCKHOLM UNIVERSITY DEPARTMENT OF STATISTICS HT-2011

PROBABILITY THEORY, ST701A, ADVANCED LEVEL, 7.5 ECTS CREDITS TEACHING PLAN

Home page

Home page of course is in <http://gauss.stat.su.se/master/slht.shtml> and will be updated regularly. Additional information about the Department of Statistics can be found in <http://www.statistics.su.se/>.

Teacher (lectures and computer exercises)

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Lectures, theoretical and computer exercises

See the last page for the schedule.

Computer exercises: One computer laboratory meeting is planned for the course. The main goal is to give students basic knowledge on how to use the Statistics Toolbox of Matlab. The toolbox provides a comprehensive set of techniques to assess and understand data, and offers a rich set of statistical plot types and interactive graphics. All toolbox functions are written in the open Matlab language so that you can check the algorithms, modify the source code, and create your own custom functions. It is recommended that all the students participate in the computer exercises in the scheduled time.

Literature

Casella G. & Berger R. L. Statistical Inference. Second Edition, Duxbury Press (Thomson Learning Academic Resource Center), 2007.

Exam

Written exam: Wednesday, 11th of January. Time: 9⁰⁰ – 14⁰⁰. Place: C497. Next written exam: TBA. Time: 9⁰⁰ – 14⁰⁰. Place: TBA

Allowed aids in the exams

Table of common distributions from Casella & Berger, p. 620-627 (will be attached), calculator, dictionaries for translation and A5 hand-written (both sides) paper with no solutions or proofs (to be submitted with the exam solutions)

Schedule of what will be covered on which classes, including lists of problems

Week/Date	Time/Place	Topic	Reading	Assignment
W1 (23/11): L1	14.00-17.00 F371	Basics of probability theory: the Kolmogorov axioms, counting probability, conditional probability and independent events, random variables and distribution functions.	1.1-1.4	1.4, 1.7, 1.12, 1.18, 1.29, 1.30, 1.34, 1.39, 1.44
W2 (25/11): L2	10.00-13.00 F271	Random variables and distribution functions (cont), density and mass functions.	1.3-1.6	1.47, 1.51, 1.53, 1.54
W3 (29/11): L3	09.00-12.00 B705	Functions of a random variable, expected values, variances, moments and moment generating functions.	2.1-2.3	2.2, 2.3, 2.8, 2.11, 2.14(a), 2.23, 2.24, 2.19, 2.30, 2.33, 2.36, 2.39
W4 (30/11): L4	9.00-12.00 B705	Exponential families, location and scale families.	3.3-3.5	3.3, 3.8, 3.9, 3.13, 3.28, 3.33(i), 3.40
W4 (1/12): L5	09.00-12.00 B705	Joint and marginal distributions, conditional distributions and independence.	4.1-4.2	4.1, 4.5, 4.10,
W5 (6/12): L6	09.00-12.00 B705	Bivariate transformations and hierarchical models.	4.3-4.4	4.15, 4.16(a), 4.19, 4.20, 4.27
W6 (7/12): L7	14.00-17.00 F271	Hierarchical models (cont.) and mixture distributions.	4.3-4.4	4.31, 4.32(b), 4.34(a)
W7 (9/12): L8	14.00-17.00 B347	Covariance and correlation. Multiple random variables and multivariate distributions. Inequalities.	4.5, 4.7	4.30, 4.55, 4.63
W8 (12/12): L9	14.00-17.00 F347	A random sample and its properties. Sums of random variables from a random sample.	5.1-5.2	
W8 (14/12): L10	14.00-17.00 F331	Sampling from the normal distribution. Various types of convergence. Central limit theorem.	5.3, 5.5	5.17, 5.18, 5.29, 5.30, 5.31, 5.34
W3 (5/12): C,	09.00-12.00 B319	Exploring probability distributions with Matlab.	1.5, 2.1, 3.2-3.3	See prep ex for Lab 1

In the following L and C stand for Lectures and theoretical exercises and Computer laborations, respectively.