Sannolikhetsteori II (Probability II) 1MS036 10512 HT2023

Teacher: Cecilia Holmgren, office 74114

Literature: A. Gut: An Intermediate Course in Probability, 2nd ed, Springer 2009.

Ch. 1, 2.1–2.3, 3.1–3.6, 5.1–5.7, 6.1–6.6

Examination: Written exam (max 40 points)+ assignments (max 3 bonus points). Permitted aids at the written exam: Table with probability distributions (Gut, Appendix B). Calculators are not allowed.For grade 5 the requirement is a total of at least 32 points, for grade 4 at least 25 points and the limit to pass (grade 3) is a total of 18 points. Bonus points are only valid at the first exam Friday, October, 20 2023.

Assignments: Two sets of assignment problems will be handed out during the course. Non-compulsory. Assignments will be marked and give up to a total of 3 bonus points added to the result of the written exam.

Course information: Course plan, assignments, etc. can be downloaded from studium:https://login.studium.uu.se/

Preliminary plan (which can be modified during the course): (15 lectures including solving problems in some of the lectures)

L1 : Tue   29/8 Introduction

L2 : Fri 1/9 Multivariate Random Variables Ch. 1: 1.1-1.2 not 1.2.2

L3 : Wed 6/9   Conditional Distributions Ch 2: 2.1-2.2

L4 : Thu 7/9   More on Conditioning, Bayes theorem Ch. 2: 2.3-2.5

L5 : Tue 12/9   Solving Some Exercises and Starting on Transforms: The Probability Generating Functon Ch 3: 3.1-3.2

L6 : Fri 15/9 More on Transforms: Moment Generating Function and Characteristic Function: Ch 3: 3.3-3.4

L7 : Mo 18/9 Even more on Transforms Ch. 3: 3.5-3.6 and Solving Some Exercises

L8 : Wed   20/9 Multivariate Normal Distributions, Linear Algebra, Covariance Matrix and linear Combinations Ch. 5: 5.1-5.3

 L9 : Mo 25/9 Multivariate Normal Distributions, Density, Conditioning Ch. 5: 5.4-5.6

L10 : Wed 27/9 Multivariate Normal Distributions, Independence and Linear Transformations Ch. 5: 5.7-5.8 and Solving Some Exercises

L11: Mo   2/10 Convergence in Probability and Convergence in Distribution Ch. 6: 6.1-6.3

L12: Fri   6/10   Convergence via transforms, law of large numbers and central limit therom Ch. 6: 6.4-6.5 (Change Characteristic Function to Moment Generating Function, when possible.)

L13: Mo 9/10   Convergence of Sums of Random Variables Ch. 6: 6.6 and Solving Some Exercises

L14: Thu   12/10   Covering Remaining Material (if we did not have time to cover everything above) and Possibly Some Repetition

L15: Tue   17/10   Repetition (Probably Solving Some Exercises from an Old Exam)

Recommended exercises:

Chapter 1   Exercise 2.1, Problem 1, 8, 13, 29, 44

Chapter 2   Exercise 1.1, 1.3, 1.5, 2.4, 3.1 (a), 3.2, Problem 1, 2, 3, 4, 5, 8, 9, 19, 40

Chapter 3   Exercise 2.1, 2.2, 2.3, 3.3, 3.4, 3.5, 3.6, Problem 2, 5, 6, 22, 26, 28, 30, 31

Chapter 5   Exercise 1.1, 1.2, 3.1, 3.2, 5.1, 5.2, 6.2, 7.1, 7.2, 8.2, Problem 2, 4, 5, 10, 12, 21, 25, 28, 30

Chapter 6   Exercise 1.2 (a), 3.3, 4.2 Problem 2, 8, 9, 11, 12, 16, 24, 25, 30