

Week 1a

Recommended exercises

Recommended exercises test the basic concepts of the material covered per lecture. Understanding of how these concepts work is key to solving more difficult exercises and exam questions. Therefore, we recommend that you try to solve and understand these problems first before moving on to the harder exercises.

Grimmett & Stirzaker

Chapter 1.2 1 5
Chapter 1.4 1 2 3

1. Consider a population where 6.5% is afflicted with a certain disease. We also know that when someone's father has this disease, his children will have probability 0.13 to get this disease. What is the probability that someone, whose father is not afflicted with the disease, gets the disease?
2. Two boxes are filled with balls. Box 1 consists of ten balls, of which three are white and seven are black. Box 2 consists of ten balls as well, but six are white and four are black. Someone takes a ball at random from box 1 and places it in box 2. After that he takes a ball from box 2 at random and sees that it is a white one. Find the probability that a white ball was taken from box 1 to box 2.

Extra exercises

Extra exercises test a more in-depth understanding of the material. These questions are often longer and more difficult. Even though these questions might require more effort, we still recommend you to give them a try.

Grimmett & Stirzaker

Chapter 1.3 4

1. A soccer game has ended in a score of 5-3 (5 goals for team A to 3 goals for team B). What is the probability that, during the game, team B was ahead with 1-2 (1 goal for team A and 2 goals for team B)?

Exam question

Sometimes, we will add an exam question so that you can test your skills. Keep in mind that we limit these questions (so that you will have enough exercises when preparing for the exam) and might therefore not fully cover the material of this week.

Someone takes an HIV-test and gets a positive result (i.e. the test indicates that someone is HIV positive). However, the test is not perfect and this person wants to know whether he really has HIV or not. The following is known: The probability that someone has HIV in this population is 0.001, the probability of a false positive (the event where someone who does not have HIV gets a positive test result) is 0.01 and the probability that someone with HIV gets a positive test result is 0.99.

- (a) Find the probability that this person has HIV.
- (b) How small must the probability on a false positive be such that the probability of a correct diagnosis, when the test gives a positive test result, is bigger than 99%?