Probability Theory for EOR 2021/2022

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Selected/Tutorial Exercises

January 8, 2022

The exercises in bold font (color red) are tutorial exercises, that will be discussed during the on-campus tutorials. You may earn bonuses by showing your results (after peer feedback) to your TAs. See details in the Course Syllabus.

In this special time period, in case you are tested positive, and you still want to earn the tutorial bonus, take a photo of your results and send it to your group TAs.

Week 1

- Textbook exercises chapter 1:
  1, 3, 4, 6, 10, 12, 13, 15, 16, 17, 23, 31, **34(b)**, 36, 38, 43, 44, 45, 49, 50, **52**.
- Additional exercises:
  I. What is the general definition of probability (mentioned in the slides)?
  II. Prove the *properties of probability, I* using the general definition of probability (mentioned in the slides).
  You can also find solutions in the textbook: theorem 1.6.2.

Week 2

- Textbook exercises chapter 2:
  1, 2, 4, 6, 7, 9, 10, **14**, 15, 16, 17, 21, 32, 34, 35, **36**, 41, 50(a), **56**.

Week 3

- Textbook exercises chapter 3:
  1, 2, 3, 8, **9**, 10, 12, 13, 17, **18**, 24, 25, 26, 31, 39, 42.

Week 4

- Textbook exercises chapter 4:
  3, 5, **13**, 18, **20**, 21, 24, 27, 30, 34, 38, 45, 48, 57, 61, **66**, 70(b), 79.

Week 5

- Textbook exercises chapter 5:
  2, 10, 12, 16, 30, 31, **32**, 35, 36, **43**, **45**, 51, 55, 56.
- Additional exercises:
  Examples 5.4.6, 5.4.7., 5.5.4., 5.7.4.

Week 6

- Textbook exercises chapter 6:
  1,2,3,5,**12**,13, 14, **16**, 18, 19, 20, **22**.
- Additional exercises:
  Prove that $E(XY) = E(X)E(Y)$ for independent discrete random variables X, Y.

Week 7

- Additional exercises:
  - **Question 2 from the Exam last academic year.**
  - **Properties of CDF.**
  - **Properties of PMF.**
  - **Properties of PDF.**
  - **Write down the PDFs and CDFs of Bern, Bin, Expo, Pois, Normal.**
  - Write down the properties of the aforementioned distributions.