Small Exercises 1

Probability Theory

These small exercises are meant to prepare the inverted classroom lecture. Keep your answers short: two or three sentences, sometimes even less, should suffice. The purpose is to shape or question your intuition, not your mathematical rigour.

Your solutions are submitted *online* in a form found under the link at the bottom of the page. The submission deadline is *before* the respective inverted classroom!

The homework exercise sheet is due later.

Problem 1: Explain the concept of a random variable in 140 characters or less.

Problem 2: What is the highest value a probability mass function can take?

Problem 3: What is the highest value a probability density function can take?

Problem 4: Is the probability distribution function of a continuous distribution always continuous?

Problem 5: Which plots have positive, which have negative Pearson correlation? Which plot shows the highest correlation?

Problem 6: Let A and B be independent events. Does that imply that they are also conditionally independent given a third event C?

Problem 7: Let X and Y be independent random variables with

$$\mathbb{E}[X] = \mathbb{E}[Y],$$
$$\mathrm{Var}[X] = \mathrm{Var}[Y].$$

Are X and Y identically distributed?