

Pre-class preparation

Please read the following textbook sections from Blitzstein and Hwang's *Introduction to Probability* (second edition) OR watched the indicated video from Blitzstein's Math 110 YouTube channel:

- Textbook: 4.1-4.2, 4.5
- Video:
 - Lecture 9: Expectation, Indicator Random Variables, Linearity (from 14:00 to 41:00)
 - Lecture 10: Expectation continued (from beginning to 13:00)
 - Read Section 4.5 (there isn't a video corresponding to LOTUS in the discrete case)

Objectives

By the end of the day's class, students should be able to do the following:

- State the definition of the expectation of a random variable
- Compute the expectation of the Bernoulli, Binomial, Hypergeometric, and Discrete Uniform random variables.
- Show that expectation is a linear function of random variables using the definition of expectation.
- Use the Law of the Unconscious Statistician (LOTUS) to compute the expected value of one variable in terms of the PMF of another related random variable.

Reflection Questions

Please submit your answers to the following questions to the corresponding Canvas assignment by 7:45AM:

1. Give an example of two random variables with different distributions that have the same expected value.
2. Suppose X is a random variable with expectation $\mathbb{E}[X] = \mu$. What is the expectation of the random variable $X - \mu$?
3. True or false? If X is a random variable with $\mathbb{E}[X] = \mu$, then $\mathbb{E}[X^2] = \mu^2$. If true, demonstrate why. If not, provide a counter-example.
4. (Optional) Is there anything from the pre-class preparation that you have questions about? What topics would you like would you like some more clarification on?