Chapter 28: Revisiting Expected Values for Joint Distributions

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Learning Objectives

1. Calculate the mean (expected value) of a joint distribution of continuous RV

Remark on expected value of one RV from joint pdf

If you are given $f_{X,Y}(x, y)$ and want to calculate $\mathbb{E}[X]$, you have two options:

1. Find $f_X(x)$ and use it to calculate $\mathbb{E}[X]$.
2. Or, calculate $\mathbb{E}[X]$ using the joint density:

$$\mathbb{E}[X] = \int_{-\infty}^{\infty} \int_{-\infty}^{\infty} x f_{X,Y}(x, y) dy dx.$$

Option 1: Expected value from a joint distribution

Example 3

Let $f_{X,Y}(x, y) = 2e^{-(x+y)}$, for $0 \leq x \leq y$. Find $\mathbb{E}[X]$.

Option 2: Expected value from a joint distribution

Example 1

Let $f_{X,Y}(x, y) = 2e^{-(x+y)}$, for $0 \leq x \leq y$. Find $\mathbb{E}[X]$.

Chapter 28-29 Revisited Slides