

Exercises on Expectation

COS 302, Fall 2020



Exercise #1

Let $f(x) = x^2 + 2$, and let X be a uniform random variable on $[-1, 1]$
What is the expected value of $f(x)$?

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Let $f(x) = x^2 + 2$, and let X be a uniform random variable on $[-1, 1]$
What is the variance of $f(x)$?

Exercise #2

Let $f(x, y) = xy^2$, and let X and Y be i.i.d. uniform random variables on $[0, 3]$
What is the expected value of $f(x, y)$?

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Let $f(x, y) = xy^2$, and let X and Y be i.i.d. uniform random variables on $[0, 3]$
What is the variance of $f(x, y)$?

Exercise #3

Let $f(\mathbf{x}) = \begin{bmatrix} 2x_1 \\ x_1 + x_2 \end{bmatrix}$, and let X_1 and X_2 be i.i.d. uniform random variables on $[0, 1]$
What is the expected value of $f(\mathbf{x})$?

Exercise #3

Let $f(\mathbf{x}) = \begin{bmatrix} 2x_1 \\ x_1 + x_2 \end{bmatrix}$, and let X_1 and X_2 be i.i.d. uniform random variables on $[0, 1]$
What is the variance (i.e., covariance matrix) of $f(\mathbf{x})$?