STAT 134: Section 11

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Conceptual Review

What are the different functions we have used to characterize (i.e., fully describe) distributions of random variables? We have seen four.

Problem 1

Suppose U has uniform $(0, 1)$ distribution. Let $W = -\log U$. Find the density of W. What kind of random variable is W?

Problem 2

Suppose we have a random variable X with continuous and strictly increasing CDF F_X. Find the distribution of $F_X(X)$.

Quiz Review

Let $X \sim \mathcal{N}(0,1)$. The density of X is $f_X(x) = \frac{1}{\sqrt{2\pi}} \exp(-\frac{x^2}{2})$. Find $\mathbb{E}(X^k)$, where k is a positive integer.

Hint: Consider odd and even values of k separately. Also, you may use the fact that, for any $m \geq 1$,

$$\int_{-\infty}^{\infty} x^{2m} e^{-x^2/2} dx = (2m-1) \int_{-\infty}^{\infty} x^{2m-2} e^{-x^2/2} dx.$$

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