Stat 134: Section 14

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Conceptual Review

Please discuss these short questions with those around you in section. These problems are intended to highlight concepts from lecture that will be relevant for today's problems.

a. What is the moment generating function of a random variable X?

b. How do we get the k_{th} moment of X from MGF of X?

c. Does MGF uniquely define a distribution? Does MGF always exist?

Problem 1

Suppose U has uniform $(0,1)$ distribution. Let $W = -\log U$. Find the density of W.

Do you recognize the distribution of W?

Problem 2

Let $X \sim \text{Binom}\,(n, p)$

1. Find the moment generating function of X, $M_X(t)$.
2. Use (a) to find $\mathbb{E}(X)$.

Hint: use the binomial theorem, which states that for any $a, b, (a+b)^n = \sum_{k=0}^{n} \binom{n}{k} a^k b^{n-k}$