Stat 134: Section 15

Adam Lucas

October 22nd, 2018

Problem 1

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

Problem 2: Geometric from Exponential

Show that if $T \sim \text{Exp}(\lambda)$, then $Z = \text{int}(T) = \lfloor T \rfloor$, the greatest integer less than or equal to T, has a geometric (p) distribution on $\{0, 1, 2, \ldots\}$. Find p in terms of λ.

Ex 4.2.10 in Pitman's Probability

How can we use the CDF of Z to simplify this problem?

Problem 3

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

a. Find the moment generating function of X, $M_X(t)$. Hint: use the binomial theorem, which states that for any a, b,
   $(a+b)^n = \sum_{k=0}^{n} \binom{n}{k} a^k b^{n-k}$.

b. Use (a) to find $\mathbb{E}(X)$ and $Var(X)$.

Ex MGF.3