Stat 134: Change of Variable/Operations Review Session

December 5th, 2018

Conceptual Review

a. Write out the five steps for computing a change of variable density.

b. What is the formula for Z = X + Y, where X, Y are continuous random variables?

c. What is the formula for Z = X/Y where X, Y are non-negative continuous random variables?

Problem 1: Properties of Exponentials

Suppose X is an Exponential(λ) and Y is a Gamma(n, λ). Let W = X/Y.

a. Find the distribution of cX

b. Find the distribution of cY

c. Use the above parts to find the CDF of W

Problem 2

Let X be the minimum of 6 independent Uniform(0,1) distributions and Y be the maximum. Find the distribution of $Z = X/Y$ and $Z = Y - X$

Problem 3

Let $U_1, U_2, ...U_n$ be independent Uniform(0,1) random variables.

a. Find the distribution of $-log(U_1U_2...U_n)$

b. Use the above to find the probability $-log(U_1U_2...U_{10}) > 8$