Stat 134: Section 18

Adam Lucas

October 31, 2018

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. If X follows a Uniform(0, 1), distribution, what is the distribution of $1 - X$?

b. From this, can you make an intuitive argument about why $1 - Y$ should follow a Beta (s, r) distribution of Y follows a Beta (r, s)?

Problem 1: Uniform Spacings

Let $X = \min(U, V)$ and $Y = \max(U, V)$ for independent uniform(0,1) variables U and V. Find the distributions of:

a. X;

b. $1 - Y$;

c. $Y - X$

Ex 5.2.13 in Pitman's Probability

Problem 2

Suppose X_1, X_2 are independent random variables with the same density function.

a. Evaluate $P(X_1 < X_2)$;

b. Continuing, suppose X_1, X_2, X_3 are independent random variables with the same density function. Evaluate $P(X_{i1} < X_{i2} < X_{i3})$ where (i_1, i_2, i_3) is a given permutation of (1,2,3).

Ex 5.2.18 in Pitman's Probability