STAT 134: Section 13

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Conceptual Review

Suppose independent $X, Y \sim N(0,1)$. Identify the distribution of:

a. X^2;

b. $X^2 + Y^2$;

c. $\sqrt{X^2 + Y^2}$;

d. $4X + 3Y + 5$

Problem 1

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 $P(X_{i_1} < X_{i_2} < X_{i_3})$ where (i_1, i_2, i_3) is a given permutation of (1,2,3).

Ex 5.2.18 in Pitman's Probability

Problem 2

X, Y are i.i.d. standard Normal variables. Find (without integration):

a. $P(X > 3Y + 2)$;

b. $P(0 < X < Y)$;

c. $P(|\min X, Y| < 1)$

Adapted from Ex 5.3.3, 5.3.6 in Pitman's Probability