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Bookmarks

▸ Module 1: The Basics of R and Introduction to the Course

▸ Entrance Survey

▸ Module 2: Fundamentals of Probability, Random Variables, Distributions, and Joint Distributions

▸ Module 3: Gathering and Collecting Data, Ethics, and Kernel Density Estimates

▾ Module 4: Joint, Marginal, and Conditional Distributions & Functions of Random Variable

Module 4: Joint, Marginal, and Conditional Distributions & Functions of Random Variable > Joint, Marginal, and Conditional Distributions > Independence of Random Variables - Quiz

Independence of Random Variables - Quiz

🔖 Bookmark this page

Question 1

1/1 point (graded)

True or false: Having information about the marginal distributions of two random variables is always enough to work backwards and reconstruct the joint distribution.

○ a. True

⦿ b. False ✔

Explanation

This is false. Joint distributions contain three pieces of information: how one variable is distributed, how a second variable is distributed, and the relationship between the two variables. Having the marginal distributions gives the first two pieces of information, but it does not give us information about how the two variables are related.

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Question 2

1/1 point (graded)

X and Y are independent if _____.

○ a. The joint PDF is equal to the sum of the marginal PDFs: $f_{xy}(x,y) = f_x(x) + f_y(y)$

◉ b. The joint PDF is equal to the product of the marginal PDFs: $f_{xy}(x,y) = f_x(x)f_y(y)$ ✔

○ c. The marginal PDFs are symmetrical: $f_x(x) = f_y(y)$

○ d. The joint PDF integrates to 1: $\iint f_{xy}(x,y)dxdy = 1$

Explanation

X and Y are independent if the joint PDF is equal to the product of the marginal PDFs, so B is correct.

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