13. Exercise: From joint PDFs to probabilities

Exercise: From joint PDFs to probabilities

8/8 points (graded)

a) The probability of the event that $0 \leq Y \leq X \leq 1$ is of the form $\int_a^b \left(\int_c^d f_{X,Y}(x,y)\,dx \right) dy$.

Find the values of a, b, c, d. Each one of your answers should be one of the following: 0, x, y, or 1.

$a =$ 0 ✔ **Answer:** 0

$b =$ 1 ✔ **Answer:** 1

$c =$ y ✔ **Answer:** y

$d =$ 1 ✔ **Answer:** 1

b) The probability of the event that $0 \leq Y \leq X \leq 1$ is also of the form $\int_a^b \left(\int_c^d f_{X,Y}(x,y)\,dy \right) dx$. Note the different order of integration as compared to part (a).

Find the values of a, b, c, d. Each one of your answers should be one of the following: 0, x, y, or 1.

$a =$ 0 ✔ **Answer:** 0

$b =$ 1 ✔ **Answer:** 1

$c =$ 0 ✔ **Answer:** 0

$d =$ x ✔ **Answer:** x

Solution:

a) For any given $y \in [0,1]$, x ranges from y to 1, yielding $\int_0^1 \int_y^1 f_{X,Y}(x,y)\,dx\,dy$.

b) For any given $x \in [0,1]$, y ranges from 0 to x, yielding $\int_0^1 \int_0^x f_{X,Y}(x,y)\,dy\,dx$.

提交 You have used 3 of 3 attempts