

## 9. Exercise: Definition of independence

### Exercise: Definition of independence

0/1 point (graded)

Suppose that  $X$  and  $Y$  are independent, with a joint PDF that is uniform on a certain set  $S$ :  $f_{X,Y}(x,y)$  is constant on  $S$ , and zero otherwise. The set  $S$

- ☒ must be a square. ✖
- ☐ must be a set of the form  $\{(x,y) : x \in A, y \in B\}$  (known as the Cartesian product of two sets  $A$  and  $B$ ). ✔
- ☐ can be any set.

#### Solution:

Let  $A$  be the set of all  $x$  on which  $f_X(x)$  is positive and let  $B$  be the set of all  $y$  on which  $f_Y(y)$  is positive. Then, the set  $S$ , on which  $f_{X,Y}(x,y) = f_X(x)f_Y(y) > 0$ , will be the Cartesian product of  $A$  with  $B$ ; it is not necessarily a square, but it cannot be an arbitrary set.

提交

You have used 2 of 2 attempts

**i** Answers are displayed within the problem

## 讨论

显示讨论

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