



MITx: 6.041x Introduction to Probability - The Science of Uncertainty



Bookmarks

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Probability
models and
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Unit overview

Lec. 8: Probability
density functionsExercises 8 due Mar
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Conditioning on an
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Independence; Bayes' rule > Lec 10 Conditioning on a random variable Independence
Bayes rule vertical



Bookmark

Exercise: Conditional PDF

(2/2 points)

The random variables \mathbf{X} and \mathbf{Y} are jointly continuous, with a joint PDF of the form

$$f_{X,Y}(x,y) = \begin{cases} cxy, & \text{if } 0 \leq x \leq y \leq 1, \\ 0, & \text{otherwise,} \end{cases}$$

where c is a normalizing constant.

a) Is it true that $f_{X|Y}(2 | 0.5)$ is equal to zero?

Yes ▾



Answer: Yes

b) Is it true that $f_{X|Y}(0.5 | 2)$ is equal to zero?

No ▾



Answer: No

Answer:

a) Values of \mathbf{Y} around $\mathbf{0.5}$ have positive probability, so that $f_Y(0.5) > 0$, and $f_{X|Y}(2 | 0.5)$ is therefore well-defined. But $x = 2$ is outside the range of values of \mathbf{X} , and $f_{X,Y}(2, 0.5) = 0$, from which it follows that $f_{X|Y}(2 | 0.5) = 0$.

b) Since $y = 2$ is outside the range of values of \mathbf{Y} , we have $f_Y(2) = 0$, and the conditional PDF $f_{X|Y}(0.5 | 2)$ is undefined.

You have used 1 of 1 submissions

Lec. 10:
Conditioning on a
random variable;
Independence;
Bayes' rule

Exercises 10 due Mar
16, 2016 at 23:59 UTC

Standard normal
table

Solved problems

Problem Set 5

Problem Set 5 due Mar
16, 2016 at 23:59 UTC

Unit summary

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