



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



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Unit overview

Lec. 8: Probability density functions

Exercises 8 due Mar 16, 2016 at 23:59 UTC

Lec. 9: Conditioning on an event; Multiple r.v.'s

Exercises 9 due Mar 16, 2016 at 23:59 UTC

Unit 5: Continuous random variables > Problem Set 5 > Problem 3 Vertical: A Joint PDF given by a simple formula



Bookmark

Problem 3: A Joint PDF given by a simple formula

(4/4 points)

Random variables X and Y are distributed according to the joint PDF

$$f_{X,Y}(x,y) = \begin{cases} ax, & \text{if } 1 \leq x \leq 2 \text{ and } 0 \leq y \leq x, \\ 0, & \text{otherwise.} \end{cases}$$

1. Find the constant a .

$$a = \boxed{3/7}$$

2. Determine the marginal PDF $f_Y(y)$. (Your answer can be either numerical or algebraic functions of y).For $0 \leq y \leq 1$,

$$f_Y(y) = \boxed{9/14}$$

For $1 < y \leq 2$,

$$f_Y(y) = \boxed{(3/14)*(4-y^2)}$$

3. Determine the conditional expectation of $1/X$ given that $Y = 3/2$.

$$\mathbf{E}[1/X \mid Y = 3/2] = \boxed{4/7}$$



You have used 2 of 2 submissions

DISCUSSION

Click "Show Discussion" below to see discussions on this problem.

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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