



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



Bookmarks

- ▶ Unit 0:  
Overview
- ▶ Entrance  
Survey
- ▶ Unit 1:  
Probability  
models and  
axioms
- ▶ Unit 2:  
Conditioning  
and  
independence
- ▶ Unit 3:  
Counting
- ▶ Unit 4: Discrete  
random  
variables
- ▼ Unit 5:  
Continuous  
random  
variables

Unit overview

Lec. 8: Probability  
density functionsExercises 8 due Mar  
16, 2016 at 23:59 UTCLec. 9:  
Conditioning on an  
event; Multiple  
r.v.'sExercises 9 due Mar  
16, 2016 at 23:59 UTCUnit 5: Continuous random variables > Lec. 10: Conditioning on a random variable;  
Independence; Bayes' rule > Lec 10 Conditioning on a random variable Independence  
Bayes rule vertical6

Bookmark

## Exercise: Stick-breaking

(3/3 points)

Consider the same stick-breaking problem as in the previous clip, and let  $\ell = 1$ . Recall that  $f_{X,Y}(x,y) = 1/x$  when  $0 \leq y \leq x \leq 1$ .a) Conditioned on  $Y = 2/3$ , the conditional PDF of  $X$  is nonzero when  $a \leq x \leq b$ . Find  $a$  and  $b$ . $a =$ 

Answer: 0.66667

 $b =$ 

Answer: 1

b) On the range found in part (a), the conditional PDF  $f_{X|Y}(x | 2/3)$  is of the form  $cx^d$  for some constants  $c$  and  $d$ . Find  $d$ . $d =$ 

Answer: -1

Answer:

a) Since the joint PDF is nonzero only for  $0 \leq y \leq x \leq 1$ , it follows that given that  $Y = 2/3$ ,  $X$  ranges on the interval  $[2/3, 1]$ .b) As a function of  $x$ , the conditional PDF has the same functional form (within a normalizing constant) as the joint PDF, and so it is of the form  $c/x$ , from which we conclude that  $d = -1$ .

You have used 1 of 2 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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