13. Exercise: Stick-breaking

Exercises due Mar 13, 2020 05:29 IST *Completed*

Exercise: Stick-breaking

2/3 points (graded)

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.

$a =$ 2/3 ✔ **Answer:** 0.66667

$b =$ 1 ✔ **Answer:** 1

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

$d =$ 0 ✖ **Answer:** -1

Solution:

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 $d = -1$.

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Answers are displayed within the problem

Discussion

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? Part b. What is functional form?

As per the solution. What is functional form? And why is it the same as the joint PDF?

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