8. Exercise: Total probability theorem II

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

Exercise: Total probability theorem II

2/2 points (graded)

On any given day, mail gets delivered by either Alice or Bob. If Alice delivers it, which happens with probability $1/4$, she does so at a time that is uniformly distributed between 9 and 11. If Bob delivers it, which happens with probability $3/4$, he does so at a time that is uniformly distributed between 10 and 12. The PDF of the time X that mail gets delivered satisfies

a) $f_X(9.5) =$ 1/8 ✔ **Answer:** 0.125

b) $f_X(10.5) =$ 4/8 ✔ **Answer:** 0.5

Solution:

The PDF is $1/4$ times a uniform on $[9, 11]$ (of height $1/2$) plus $3/4$ times a uniform on $[10, 12]$ (again of height $1/2$).

a) At time 9.5, only the first uniform is nonzero, yielding $f_X(9.5) = (1/4) \cdot (1/2) = 1/8$.

b) At time 10.5 both uniforms are nonzero, yielding $f_X(10.5) = (1/4) \cdot (1/2) + (3/4) \cdot (1/2) = 1/2$.

Submit You have used 1 of 3 attempts

Answers are displayed within the problem

Discussion

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?	Part B I thought the probability from X= 10-11 is 1. My logic is there is a probability of 1/4 from X=9-10 and 1/4+...	3
☑	Problem a The probability that Alice gets to deliver the message is 1/4. The probability that Alice delivers the messa...	2
💬	Part B tip Don't go too fast for the part B and read well the times of each events ;)	7
💬	Probability of a point equals zero Doesn't the probability of a point equal to zero apply here?	4 new 7
?	why don't you multiply it by 1/3? instead of what it says in the solution. This is a longer time interval than in the example in the video, I do...	2
?	E[X] just want to make sure I understand how to do various calculations - would E[X] = 43/4 (10.75)?	1 new 3
💬	conceptual confusion (points vs spans) To me, when you say fX(x) where x is a single number strikes me as a point, with probability 0. On the ot...	3
☑	What does "The PDF of the time X that mail gets delivered satisfies..." means? Are we looking to calculate P(X < 9.5) and P(X < 10.5) ?	3
?	Reminder Can anyone remind me how do we calculate the Probability of uniform for interval between 9 & 11? wha...	3