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11. Exercise: Independence and expectations

Exercises due Feb 28, 2020 05:29 IST Completed

Exercise: Independence and expectations

2/2 points (graded)

Let X and Y be independent positive discrete random variables. For each of the following statements, determine whether it is true (that is, always true) or false (that is, not guaranteed to be always true).

1.
$$\mathbf{E}\left[X/Y\right] = \mathbf{E}\left[X\right]/\mathbf{E}\left[Y\right]$$

2.
$$\mathbf{E}[X/Y] = \mathbf{E}[X] \mathbf{E}[1/Y]$$

Solution:

- 1. There is no reason why this statement should be true, and it is easy to come up with examples where it fails.
- 2. True. Note that $X/Y=X\cdot (1/Y)$. Furthermore, since X and Y are independent, so are X and 1/Y. The validity of the statement follows.

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You have used 1 of 1 attempt

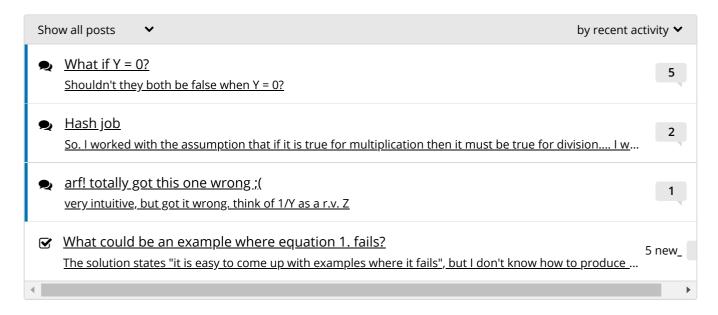
1 Answers are displayed within the problem



Discussion

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Topic: Unit 4: Discrete random variables:Lec. 7: Conditioning on a random variable; Independence of r.v.'s / 11. Exercise: Independence and expectations



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