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

   False ✔ **Answer:** False

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

   True ✔ **Answer:** True

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.

Submit You have used 1 of 1 attempt

Answers are displayed within the problem

Discussion

Hide Discussion

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

Show all posts | by recent activity

- What if Y = 0? — 5
  Shouldn't they both be false when Y = 0?
- Hash job — 2
  So. I worked with the assumption that if it is true for multiplication then it must be true for division.... I w...
- arf! totally got this one wrong ;(— 1
  very intuitive, but got it wrong. think of 1/Y as a r.v. Z
- What could be an example where equation 1. fails? — 5 new
  The solution states "it is easy to come up with examples where it fails", but I don't know how to produce ...