12. Exercise: Memorylessness of the geometric

Exercises due Feb 28, 2020 05:29 IST *Completed*

Exercise: Memorylessness of the geometric

2/2 points (graded)

Let X be a geometric random variable, and assume that $\mathsf{Var}(X) = 5$.

a) What is the conditional variance $\mathsf{Var}(X - 4 \mid X > 4)$?

$\mathsf{Var}(X - 4 \mid X > 4) =$ 5 ✔ **Answer:** 5

b) What is the conditional variance $\mathsf{Var}(X - 8 \mid X > 4)$?

$\mathsf{Var}(X - 8 \mid X > 4) =$ 5 ✔ **Answer:** 5

Solution:

a) The conditional distribution of $X - 4$ given $X > 4$ is the same geometric PMF that describes the distribution of X. Hence $\mathsf{Var}(X - 4 \mid X > 4) = \mathsf{Var}(X) = 5$.

b) In the conditional model (i.e., given that $X > 4$), the random variables $X - 4$ and $X - 8$ differ by a constant. Hence they have the same variance and the answer is again 5.

Submit You have used 2 of 3 attempts

Answers are displayed within the problem

Discussion

Topic: Unit 4: Discrete random variables:Lec. 6: Variance; Conditioning on an event; Multiple r.v.'s / 12. Exercise: Memorylessness of the geometric

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- Geometric property
  In (b) , we are interested in the distribution of X-8 , given that 4 tosses have occured with tails. What abo... — 2
- Does X-8 makes sense when X is between 5 and 8, inclusive? — 6 new — 8
- I wrote a python code to illustrate and prove the b)
  I wasn't sure whether the rule of linearity of expectations applies to the second case where the distributi... — 1
- Got both right, but the explanation isn't quite what I expected
  I got to the correct answer but not along the same lines of the solution: in the slide regarding properties ... — 3
- Getting to the solution mathematically? — 2
- Doubt
  https://en.wikipedia.org/wiki/Geometric_distribution Under Properties section, different expressions are... — 1
- How do I answer these?
  Looks like my brain is fried. Which lectures / parts do I watch again to be able to answer these? And, any ... — 7
- Why are the explanations for the solutions to (a) and (b) different?
  I used the reasoning applied in (b) to both parts of the problem. Was that reasoning incorrect for (a)? — 4 new — 9