10. Exercise: Conditional independence

Exercises due Feb 12, 2020 05:29 IST   *Completed*

Exercise: Conditional independence

2/2 points (graded)

Suppose that A and B are conditionally independent given C. Suppose that $\mathbf{P}\left(C\right) > 0$ and $\mathbf{P}\left(C^c\right) > 0$.

1. Are A and B^c guaranteed to be conditionally independent given C?

   | Yes ▾ | ✔ **Answer:** Yes

2. Are A and B guaranteed to be conditionally independent given C^c?

   | No ▾ | ✔ **Answer:** No

Solution:

1. We have seen that in any probability model, independence of A and B implies independence of A and B^c. The conditional model (given C) is just another probability model, so this property remains true.

2. This may be true in some special cases, e.g., if A and B both have zero probability. However, it is in general false. Suppose, for example, that events A and B have nonempty intersection inside C, and are conditionally independent, but have empty intersection inside C^c, which would make them dependent (given C^c).

| Submit | You have used 1 of 1 attempt

ⓘ   Answers are displayed within the problem

Discussion

Topic: Unit 2: Conditioning and independence:Lec. 3: Independence /
10. Exercise: Conditional independence

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💬 **Mathematical proofs?**   **10**
Could someone share a mathematical proofs for the conditions above?

💬 **Disjoint ans Independence**   **2**
Are disjoints events always dependent ? Because occurence of one tells us non occurence of the other.

💬 **q1. Can someone check my line of argument?**   **6**

💬 **When P(AnB|C) = P(B|C) - where I went wrong.**   **2**

💬 **Q1 : Assumption there could not no common section of A intersection B' in given C ....**   **4**
As mentioned "independence does not imply conditional independence", hence there could not no com...

💬 **Mathematical notion of events being independent seems to be all about preserving ratios.**   **1**

❓ **Struggle with all these notions - any additional material to be recommended?**   **1**
Hi! I really struggle with all these different notions... I do get the right anwser to most of the exercises, b...

❓ **Q1) Are A and Bc guaranteed to be conditionally independent given C ?**   **2**
What if Events B and C are one and the same(Same area in the sample space). Now how does this condit...

💬 **Great Trick**   2 new
If you think of C as just being another sample space you can make abstraction of it. Make's the problem l...

☑ **About Q1**   **4**
Assuming a sample space where the intersection between A and C is exactly the same as the intersectio...