



MITx: 6.041x Introduction to Probability - The Science of Uncertainty



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Unit overview

Lec. 2:
Conditioning and Bayes' rule
Exercises 2 due Feb 17, 2016 at 23:59 UT

Lec. 3:
Independence
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Solved problems

Problem Set 2
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EXERCISE: CONDITIONAL INDEPENDENCE (2/2 points)

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

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

Answer:

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).

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