Exercise: Independence of multiple events

Bookmark this page

Exercise: Independence of multiple events

2/2 points (graded)

Suppose that A, B, C, and D are independent. Use intuitive reasoning (not a mathematical proof) to answer the following.

1. Is it guaranteed that $A \cap C$ is independent from $B^c \cap D$?

Yes ✔ **Answer:** Yes

2. Is it guaranteed that $A \cap B^c \cap D$ is independent from $B^c \cup D^c$?

No ✔ **Answer:** No

Answer:

1. The occurrence of event $A \cap C$ contains information about A and C, but provides no information on the occurrence of B, D, or for that matter, $B^c \cap D$. Hence we have independence.

2. Event D influences both of the events $A \cap B^c \cap D$ and $B^c \cup D^c$, and therefore introduces a dependence between them. For a more concrete argument, if we are told that event $A \cap B^c \cap D$ occurs, then we know that D occurred. Therefore, D^c did not occur, and this generally reduces the probability of event $B^c \cup D^c$.

Submit You have used 1 of 1 attempt

✔ Correct (2/2 points)