



8. Exercise: Indicator variables

Exercises due Feb 28, 2020 05:29 IST Completed

Exercise: Indicator variables

2/2 points (graded)

Let A and B be two events (subsets of the same sample space Ω), with nonempty intersection. Let I_A and I_B be the associated indicator random variables.

For each of the two cases below, select one statement that is true.

a) $I_A + I_B$:

is not the indicator random variable of any event ▾



Answer: is not the indicator random variable of any event

b) $I_A \cdot I_B$:

is the indicator variable of the event $A \cap B$ ▾



Answer: is the indicator variable of the event $A \cap B$

(*Bug warning:* In some browsers, the mathematical content in each choice in the dropdown menu may appear duplicated, e.g. $A \cup B$ may show up twice as $A \cup B A \cup B$.)

Solution:

a) If the outcome of the experiment lies in the intersection of the events A and B , then $I_A + I_B$ takes the value of 2. But indicator random variables can take only the values 0 or 1. Therefore, $I_A + I_B$ is not an indicator random variable.

b) Note that $I_A \cdot I_B$ can take only the values 0 or 1. It is equal to 1 if and only if $I_A = 1$ (i.e., event A occurs) and $I_B = 1$ (i.e., event B occurs). Thus, $I_A \cdot I_B$ takes the value of 1 if and only if both A and B occur, and so it is the indicator random variable of the event $A \cap B$.



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i Answers are displayed within the problem

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☒ Operations between Indicator Variables.

1 new_

Do indicator variable operations always need to yield 1 or 0 to be a valid indicator variable? If so, would y...

☒ Are A and B independant?

4

It doesn't say whether the events A and B are independant. Without this information we cannot make ne...

Drawing the sets helps

2

Hi, I found it useful to draw both sets and their intersection and decide what the output would be for ea...

☐ Literature on Indicator Variables

5

Greetings, Is there literature on Indicator variables? I looked up in the prescribed book, but I could not fi...

☐ Disjoint sets

2

Without giving away too much of the answer for part A of this question: It seems that $IA + IB$ would in fac...

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