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Unit 4: Discrete random variables > Lec. 6: Variance; Conditioning on an event;
Multiple r.v.'s > Lec 6 Variance Conditioning on an event Multiple r v s vertical9

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Exercise: Using linearity of expectations
 (2/2 points)
We have two coins, A and B. For each toss of coin A, we obtain Heads with
probability $1/2$; for each toss of coin B, we obtain Heads with probability
$1/3$. All tosses of the same coin are independent.

We toss coin A until Heads is obtained for the first time. We then toss coin
B until Heads is obtained for the first time with coin B.

The expected value of the total number of tosses is:

| 5 |

✔ **Answer:** 5

Answer:
Let T_A and T_B be the number of tosses of coins A and B,
respectively. We know that T_A is geometric with parameter $p = 1/2$,
so that $\mathbf{E}[T_A] = 1/p = 1/(1/2) = 2$. Similarly, $\mathbf{E}[T_B] = 3$. The total
number of coin tosses is $T_A + T_B$. Using linearity,

$$\mathbf{E}[T_A + T_B] = \mathbf{E}[T_A] + \mathbf{E}[T_B] = 2 + 3 = 5.$$

You have used 1 of 2 submissions

Exercises 7 due Mar
02, 2016 at 23:59 UTC

Solved problems

**Additional
theoretical
material**

Problem Set 4
Problem Set 4 due Mar
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Unit summary

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