6. Exercise: Variance of the uniform

Exercises due Feb 28, 2020 05:29 IST *Completed*

Exercise: Variance of the uniform

2.0/2.0 points (graded)

Suppose that the random variable X takes values in the set $\{0, 2, 4, 6, \ldots, 2n\}$ (the even integers between 0 and $2n$, inclusive), with each value having the same probability. What is the variance of X? *Hint:* Consider the random variable $Y = X/2$ and recall that the variance of a uniform random variable on the set $\{0, 1, \ldots, n\}$ is equal to $n\,(n+2)\,/12$.

Express your answer in terms of n using standard notation. Remember to write '*' for all multiplications and to include parentheses where necessary.

$\mathrm{Var}\,(X) =$ n*(n+2)/3 ✔ **Answer:** n*(n+2)/3

STANDARD NOTATION

Solution:

Following the hint, let $Y = X/2$. The random variable Y takes values in the set $\{0, 1, 2, \ldots, n\}$, each value having the same probability. Therefore, Y is uniform and has a variance of $n\,(n+2)\,/12$. Since $X = 2Y$,

$$\mathrm{Var}\,(X) = \mathrm{Var}\,(2Y) = 4 \cdot \mathrm{Var}\,(Y) = \frac{4}{12} n\,(n+2)\,.$$

Submit You have used 2 of 3 attempts

Answers are displayed within the problem

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Topic: Unit 4: Discrete random variables:Lec. 6: Variance; Conditioning on an event; Multiple r.v.'s / 6. Exercise: Variance of the uniform

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?	confused with formula why cant I use the formula given in the video where n = b-a and in this case b = 2n and a = 0? This yields ...	4
?	[STAFF] I got the answer correct but still didn't get points Hi, I got the answer correct but as my answer didn't match the standard notation value in the system, it ...	4
	Hint shouldn't have been given That would have made the problem more interesting	7 new 10
	Hint I took variance of X/2, and use the variance of a Uniform random variable. And multiply with 2 to get act...	4 new
	Zero start of set confusing Because the set starts with 0, using the formula given as an answer makes a single set with only the first ...	1 new
	Approaches for this one I derived the formula from scratch drawing a diagram similar to the video with n variables each with unif...	1

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