19. Exercise: Uniform probabilities on the integers

Exercises due Feb 5, 2020 05:29 IST *Completed*

Exercise: Uniform probabilities on the integers

1/1 point (graded)

Let the sample space be the set of all positive integers. Is it possible to have a “uniform" probability law, that is, a probability law that assigns the same probability c to each positive integer?

No ✔ **Answer:** No

Solution:

Suppose that $c = 0$. Then, by countable additivity,

$$1 = \mathbf{P}(\Omega) = \mathbf{P}\big(\{1\} \cup \{2\} \cup \{3\} \cdots\big) = \mathbf{P}(\{1\}) + \mathbf{P}(\{2\}) + \mathbf{P}(\{3\}) + \cdots = 0 + 0 + 0 + \cdots = 0,$$

which is a contradiction.

Suppose that $c > 0$. Then, there exists an integer k such that $kc > 1$. By additivity,

$$\mathbf{P}\big(\{1, 2, \ldots, k\}\big) = kc > 1,$$

which contradicts the normalization axiom.

Submit You have used 1 of 1 attempt

Answers are displayed within the problem

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? Regarding the question
if the number of items in the set is k which is the last term of the set, the probability of any item would ordinarily be 1/k and 1/k... 2

? Resources on understanding this better?
Hi all - I don't think I grasp this as well as I should. Does anyone have pointers on where I can read up / watch to learn more on ... 3

how this question is different from example with a coin?
Guys, please help me understand how this question is different from the example at the beginning of last video - coin tossing! t... 7

Second contradiction was tricky
Until you notice that P({1, 2, 3, ... ,k } equals c + c + c + ... + c, k times. which of course is the definition of multiplication: kc 5

? Just to know if I understand this 1

How is this different from a Standard Probability Distribution?
I know perhaps this is going over what hasn't been covered but in a Standard Uniform Distribution, f(X) = 1/(theta) where theta ... 5

c is a const but not a equation, lol 1

? Neither 0 is positive nor the negative
Quiz says: Let the sample space be the set of all positive integers, that is, a probability law that assigns the same probability c to... 4
★ Following

A non math major interpretation
I finally interpreted this question to be asking... "Can you assign a probability to any SINGLE integer, or do you need a SEQUENC... 2

additivity
the lecture says 'additivity holds only for 'countable' sequence of events. this case is not countable, why should we use this equ... 1 new

panos
Any countable sequence of disjoint sets . 1