STAT 330
Tutorial 2

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Sept 21st / Sept 23rd

SFU

Announcement

The tutorial will not be recorded from next week

All three sections will still be live sections

Reminder!

1st homework assignment is due on
September 23rd by 17:30

Submit by Canvas

Example similar to 1.5.8

Let X have the discontinuous cdf

$$F_X(x) = \begin{cases} 0 & x < 0 \\ x/2 & 0 \le x < 1 \\ 1 & 1 \le x. \end{cases}$$

Definitions of Probability

- Frequency Definition
- Classical Definition
- Axiom Definition

Frequency Definition Example

Example:

The probability of a coin landing heads up?

Classical Definition Example

Same Example:

Set Theory Example

1.2.1. Find the union $C_1 \cup C_2$ and the intersection $C_1 \cap C_2$ of the two sets C_1 and C_2, where

(c) $C_1 = \{(x, y) : 0 < x < 2, 1 < y < 2\}$, $C_2 = \{(x, y) : 1 < x < 3, 1 < y < 3\}$.

Set Theory Example

1.2.2. Find the complement C^c of the set C with respect to the space $\mathcal{C}$ if

(c) $\mathcal{C} = \{(x, y) : |x| + |y| \leq 2\}$, $C = \{(x, y) : x^2 + y^2 < 2\}$.

Set Theory Example

1.2.13. Let $\mathcal{C}$ denote the set of points that are interior to, or on the boundary of, a square with opposite vertices at the points $(0,0)$ and $(1,1)$. Let $Q(C) = \int \int_C dy\, dx$.

(c) If $C \subset \mathcal{C}$ is the set $\{(x, y) : 0 < x/2 \leq y \leq 3x/2 < 1\}$, compute $Q(C)$.

Probability Rule Example

Flip a fair coin three times.

A={the first is a head}

B={there are exactly two heads}

Find $P(A \cup B)$

Probability Rule Example

1.3.2. A random experiment consists of drawing a card from an ordinary deck of 52 playing cards. Let the probability set function P assign a probability of $\frac{1}{52}$ to each of the 52 possible outcomes. Let C_1 denote the collection of the 13 hearts and let C_2 denote the collection of the 4 kings. Compute $P(C_1)$, $P(C_2)$, $P(C_1 \cap C_2)$, and $P(C_1 \cup C_2)$.

Conditional Probability Example

Flip a fain coin three times.

A={the first is a head}

B={there are exactly two heads}

Find $P(A|B)$

Conditional Probability Example

1.4.5. A hand of 13 cards is to be dealt at random and without replacement from an ordinary deck of playing cards. Find the conditional probability that there are at least three kings in the hand given that the hand contains at least two kings.

Independence Example

Flip a fain coin three times.

A={the first is a head}

B={there are exactly two heads}

If A and B independent?

Independence Example

1.4.23. Let C_1, C_2, C_3 be independent events with probabilities $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, respectively. Compute $P(C_1 \cup C_2 \cup C_3)$.

Questions