MATHEMATICS

Handbook of Statistics

Author:
David Silva Sanmartín

February 21, 2020

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2 Discrete uniform distribution

2.1 Description

Used to model experimental outcomes which are "equally likely".

2.1.1 Probability mass function

$$P(X = k) = \frac{1}{N}, \quad k = 1, \ldots, N$$

2.1.2 Cumulative distribution function

$$P(X \leq k) = \frac{k}{N}, \quad k = 1, \ldots, N$$

2.1.3 Plot

2.2 Moments

Mean	$\frac{N+1}{2}$
Variance	$\frac{(N-1)(N+1)}{2}$

3 Binomial distribution

3.1 Description

A binomial experiment involves n independent and identical trial such that each trial can result into one of the two possible outcomes: success of failure. If p is the probability of observing success in each trial, then the number of successes X that can be observed out of these n trials is referred to as the **binomial random variable with n trials and success probability p**.

3.1.1   Probability mass function

The probability of observing k successes out of n trials is given by the following probability mass function

$$P(X = k \mid n, p) = \binom{n}{k} p^k (1 - p)^{n-k}, \quad k = 0, 1, \ldots, n$$

3.1.2   Cumulative distribution function

$$P(X \leq k \mid n, p) = \sum_{i=0}^{k} \binom{n}{i} p^i (1 - p)^{n-i}, \quad k = 0, 1, \ldots, n$$

3.2   Moments

3.3   Plots

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