

Lecture - 10

Probability & Statistics

- Linearity property of expectation -
- Memoryless Property of Geometric distribution.
- Hypergeometric distribution
(picking balls without replacement)
~~is~~ NOT iid.

Negative binomial distribution. (Seqⁿ of Bernoulli trials)

$X = \#$ of failures before the r -th success

(different from geometric, only in the stopping criteria)

i.i.d.

$$P(X=n) = \binom{n+r-1}{r-1} p^r (1-p)^n$$

$$n = 0, 1, 2, \dots$$

$p =$ probability of success.

Continuous random variable

A random variable X is continuous if there is a non-negative function f such that

$$\begin{aligned} P(\{\omega \mid X(\omega) \in B\}) \\ &= P(X \in B) \\ &= \int_B f(x) dx \end{aligned}$$

for any subset B of the real line.

The function f is called the probability density function for the R.V. X .

\mathcal{B} We restrict ourselves only
to ~~for~~ PDF which ~~are~~
have ~~at~~ only finitely/
countably infinitely many
discontinuities.

\mathcal{B} \mathcal{B} — is union of finitely/
countably infinitely many
intervals.

$$f: \mathbb{R} \rightarrow [0, \infty)$$

must have unit area.

$$\int_{-\infty}^{\infty} f(x) dx = 1.$$

