

DIS 5B

Tuesday, July 17, 2018

10:22 AM

Topic: Discrete Random Variables

Random Variables another way to "group" outcomes

- A RV is a function $\Omega \rightarrow \mathbb{R}$
 $P(X=a) = P(\{\omega \in \Omega : X(\omega) = a\})$
- * However, it's easier to think of it as a "random variable"
- Distribution: possible values a random variable can take on with corresponding probability

Binomial RV : $X \sim \text{Bin}(n, p)$

- number of success in n independent trials,
given $P(\text{success})$ for each trial is p
- PMF: $P(X=k) = \binom{n}{k} p^k (1-p)^{n-k}$

Geometric RV : $X \sim \text{Geo}(p)$

- number of independent trials to get the first success
given $P(\text{success})$ for each trial is p
- PMF: $P(X=k) = (1-p)^{k-1} p$
- $P(X > k) = (1-p)^k$

Poisson RV: $X \sim \text{Poisson}(\lambda)$

- number of occurrence in a fixed time period
given occurrence rate is λ per fixed time period
- PMF: $P(X=k) = \frac{\lambda^k \cdot e^{-\lambda}}{k!}$