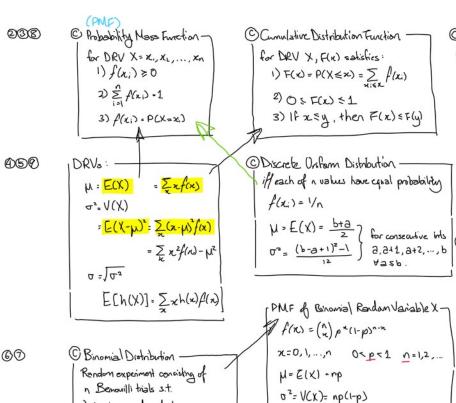
## 213L4: Discrete Probability Distributions

June 12, 2020 1:28 PM

- 1. Discrete Random Variables (DRV)
- 2. Probability Distributions & Probability Mass Function
- 3. Cumulative Distribution Functions
- 4. Mean & Variance of Discrete Random Variable
- 5. Discrete Uniform Distribution
- 6. Binomial Distribution
- 7. Geometric & Negative Binomial Distributions
- 8. Hypergeometric Distribution
- 9. Poisson Distribution



OHypergeometric Distribution

Hypergeometric random variable X u/

K successes, N+K failures,  $p = \frac{k}{N}$   $f(x) = \frac{\binom{k}{N}\binom{N-k}{n-k}}{\binom{N}{N}}$   $x = \max\{0, n+K+N\}$  to  $\min\{K, n\}$   $\mu: E(X) = np$   $\sigma^2: V(X) = np(1-p)\left(\frac{N-n}{N-1}\right)$ Concentration factor

© Poisson Distribution

Partition intends of real #s into subintends of small enough knoth st. if counts are random,

1) P(>1 count) = 0

2) P(count;) is equal V i Esubintenal

8) Count is independent

Poisson random variable X w/ O = X  $f(x) = \frac{e^{-x} X^{x}}{x!}$  x = 0, 1, ...  $\mu: E(x) = X$   $\sigma^{2}: V(X) = X$ 

1) trials are independent

2) only 2 possible outcomes

p, in each trial.

per trial (SUCCESS & FAILURE)

3) constant probability of success,

© Geometric Briomial Distributions: Geometric random variable X u/  $0 <math>\times -1, 2, ...$   $\Rightarrow \# \text{ of trials with first success}$   $f(x) = (1-p)^{x-1}p$   $M = F(X) = \frac{1}{p}$  $\sigma^2 = V(X) = (1-p)/p^2$