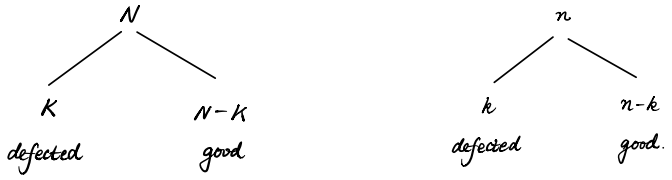
Math 493: Mathematical Statistics
Lecture 03

Sep 6th, 2017

Today's topic: hypergeometric distribution

hypergeometric distribution

Let's say if you have a population of size N, sample of size n



$p(k)$ = prob of k (defected bulbs)

N = number of possible samples of size n from lot of size N.

$$\underbrace{\binom{K}{k}\binom{N-K}{n-k}}$$

# of samples with k defective bulbs

So $p(k) = \dfrac{\binom{K}{k}\binom{N-K}{n-k}}{\binom{N}{n}}$ hypergeometric distributions

Even odd prob

o	o	o	o
o	o	e	e
o	e	e	o
e	e	e	e

```
bulbSample = Sample( c(1:N), n, replace = FALSE)
bad = sample( c(1:N), k, replace = FALSE)
```

Chapter 3 Read the book !!!

Conditional probability and independence

$E, F \subset X$

$P(E|F)$ = conditional probability of E given F (definition)

$$= \frac{P(E \cap F)}{P(F)}$$

Prob 17 Chapter 3

In a community, some have dogs / cats want P(family owns a dog given they own a cat)

36% own dog — $P(D) = 0.36$

30% cat — $P(C) = 0.30$

22% of those that own dog also own a cat — $P(C|D) = 0.22$

D = own dog

C = own cat