

Some discrete random variables:

Discrete Uniform (equally likely outcomes)

Bernoulli

Binomial

Geometric

Negative Binomial

Hypergeometric

Multinomial

Poisson

Make up a table of these with columns

pmf

context - general

- example with specific parameter values

mean

SD

parameters in terms of mean and SD

mgf

Also, keep track of the linkages between these distributions:
(There will be more when we look at continuous distributions).

dollar bill trick:

ruler 6 inch or larger 30 cm reaction timer

Probability of catching before 17.5/100 seconds = ? about .5

Training period, then constant probability

Independent? Then --->

Bernoulli trials

Bernoulli - famous mathematician Jakob Bernoulli 1654-1705

Bernoulli rv - $X = 1$ or 0 with probs p or $1-p$ resp. $P(X=1)=p$

Estimate probability by number of successes / number of trials

Focus on number of successes as RV.

X (generic) = number of successes in n trials with $P(\text{success})=p$

$P(X=x) = nCx p^{**x} (1-p)^{**(n-x)}$ $x=0,1,\dots,n$ see p 103 bottom

SSSFFSFSFS a sequence of 10 Bernoulli trials in which $X=6$

How many ways to write 6 Ss and 4 Fs ? $10C6$

What is prob of particular sequence ? $p^{**x} (1-p)^{**(n-x)}$

Binomial Distribution

mean ? np

var ? $npq = np(1-p)$

SD ? $\text{sqrt}[np(1-p)]$

example: $n = 100, p = .5$ mean 50, SD = 5

shape? skewed right for $p < .5$, left for $p > .5$
tight over range for big n

tables: binomial p 404-406 various n up to $n=20$ various p

Other Bernoulli trial models: Geometric, Neg Binomial (pp 111-116)

Assignment 2: Hand in at class or tutorial Wed Sept 26.

Ch 3: Exercises 3.1-10, 3.2-10, 3.3-4, 3.4-4, 3.5-10 (examples of your own creation!), 3.6-4.