Slides

If the two outcomes are *not* mutually exclusive:

$$P\left(\{2\times H\}\cup\{3\times H\}\right)=\frac{4}{8}+\frac{1}{8}-\frac{1}{8}=\frac{4}{8}=0.5$$

$$P\left(\{2\times H\}\cap\{1\times T\}\right)+P\left(3\times H\right)$$

- the mean of x is 9
- the variance of x is 11
- the mean of y is 7.50
- the variance of y is 4.125
- the correlation coefficient of x and y is 0.816
- the best fit line is given by $y=3.00+0.500x$

urn:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
10 samples selected with replacement:	5	2	12	19	10	5	3	19	11	4										
10 samples selected with replacement:	$\boxed{5}$	2	12	$\boxed{19}$	10	$\boxed{5}$	3	$\boxed{19}$	11	4										
10 samples selected without replacement:	15	8	13	5	4	19	7	1	20	10										

$$P(H,H,T)+P\left(\text{⚁},\text{⚅}\right)-P\left(H,H,H\cap\text{⚁},\text{⚅}\right)$$

$$p=2/3$$

We failed to reject $H_\circ$ for $\hat{p}=\frac{2}{5}=0.4$. How about $\hat{p}=\frac{6}{15}=0.4$?

$$k\in R$$

Next, how about $\hat{p}=\frac{12}{30}=0.4$?
Which values of p are compatible with the observation of $k=2$ successes out of $n=5$ claims?

$$P(k\leq 2|p=2/3,n=5)=\sum_{i=0}^{2}\binom{5}{i}(2/3)^i(1/3)^{n-i}=0.21\geq\alpha/2$$

Assuming that $H_\circ$ is true, the probability of incurring a type-I error is:

1 experiment: $\alpha = 5\%$

2 experiments: $1 - (1 - \alpha)^2 = 9.75\%$

3 experiments: $1 - (1 - \alpha)^3 = 14\%$

48 experiments: $1 - (1 - \alpha)^{48} = 91.5\%$

N experiments: $1 - (1 - \alpha)^N\%$

Bonferroni correction: α/N

What is λ?

the binomial distribution

the Poisson distribution

What is so normal about the Gaussian distribution?

What is $s[z]$?

$$s[d] = \sqrt{s[x]^2 + s[y]^2}$$

$$z = x + y$$

$$z = x - y$$

$$s[z]^2 = s[x]^2 + s[y]^2$$

$$z = xy$$

$$\left(\frac{s[z]}{z}\right)^2 = \left(\frac{s[x]}{x}\right)^2 + \left(\frac{s[y]}{y}\right)^2$$

$$s[y]^2 = y^2\left(2\frac{s[t]}{t}\right)^2$$

$$2 \times 0.0000042 = 0.0000084 < \alpha$$

P($\geq$ 9.0 earthquake)?

$$\frac{\begin{array}{c}44 + 51 + 79 + 65 + 27 + 31 + 4 + 355 + 22 + 352 + 287 + 7 + 287 + 339 + 0 \\ 276 + 342 + 355 + 334 + 296 + 7 + 17 + 351 + 349 + 37 + 339 + 40 + 324 + 325 + 334\end{array}}{30}$$

$$= 189.2^\circ$$

$$\sin[\theta \pm \phi] = \sin[\theta]\cos[\phi] \pm \cos[\theta]\sin[\phi]$$

$$359^\circ - 1^\circ = 2^\circ$$

$$\bar{R} = 0.88$$

$$s_c = 0.51$$

$$s_c = 2.04$$

x	0.85	0.84	0.83	0.8	0.77	0.75	0.74	0.73	0.71	0.6
y	0.53	0.54	0.56	0.6	0.64	0.66	0.67	0.68	0.71	0.8
x	-0.87	-0.85	-0.83	-0.8	-0.77	-0.75	-0.74	-0.73	-0.69	-0.64
y	-0.50	-0.53	-0.56	-0.6	-0.64	-0.66	-0.67	-0.68	-0.72	-0.77

Quizzes

Given $k = 9$ successes out of n=10 binomial trials, carry out a hypothesis test for

$H_0 : p = 0.6$

versus

$H_a : p > 0.6$

at a 95% confidence level.

X	0	1	2	3	4	5	6	7	8	9	10
$P(X)$	0.006	0.040	0.12	0.21	0.25	0.20	0.11	0.042	0.011	0.0016	0.00001
$P(x \le X)$	0.006	0.046	0.17	0.38	0.63	0.83	0.95	0.990	1	1	1
$P(x \ge X)$	1	0.994	0.954	0.833	0.618	0.367	0.166	0.055	0.0123	0.0017	0.0001

Can the null hypothesis be rejected?

Given $k = 9$ successes out of n=10 binomial trials, carry out hypothesis test of

$H_\circ : p = 0.6$

versus

$H_a : p \neq 0.6$

at a 95% confidence level.

X	0	1	2	3	4	5	6	7	8	9	10
$P(X)$	0.006	0.040	0.12	0.21	0.25	0.20	0.11	0.042	0.011	0.0016	0.00001
$P(x \le X)$	0.006	0.046	0.17	0.38	0.63	0.83	0.95	0.990	1	1	1
$P(x \ge X)$	1	0.994	0.954	0.833	0.618	0.367	0.166	0.055	0.0123	0.0017	0.0001

Can the null hypothesis be rejected?

Given $k = 9$ successes out of n=10 trials, carry out a hypothesis test for

$H_\circ : p = 0.6$

versus

$H_a : p < 0.6$

at a 95% confidence level?

X	0	1	2	3	4	5	6	7	8	9	10
$P(X)$	0.006	0.040	0.12	0.21	0.25	0.20	0.11	0.042	0.011	0.0016	0.00001
$P(x \leq X)$	0.006	0.046	0.17	0.38	0.63	0.83	0.95	0.990	1	1	1
$P(x \geq X)$	1	0.994	0.954	0.833	0.618	0.367	0.166	0.055	0.0123	0.0017	0.0001

Can the null hypothesis be rejected?