STT 200 5:30 pm 3-22-10a

Note Title 3/22/2010

RECALL z-CI FOR p: $\hat{p} \pm 1.96 \sqrt{\hat{p}\hat{q}/n}$ (for 95%)

$\hat{p}$: SAMPLE PROPN

$1.96\sqrt{\hat{p}\hat{q}/n}$: M.O.E. OF $\hat{p}$ (ESTIMATED)

WITH-REPL: $P(p \text{ IN } \hat{p} \pm \boxed{1.96\sqrt{\hat{p}\hat{q}/n}}) \sim .95$

WITHOUT-REPL. $\hat{p} \pm 1.96 \sqrt{\hat{p}\hat{q}/n}\sqrt{\frac{N-n}{N-1}} \to .95$ as $n \to$

$\sqrt{\frac{N-n}{N-1}}$ ← F.P.C.

CI for μ: $\bar{x} \pm 1.96\, \sigma/\sqrt{n}$

WITHOUT REPL ↪ $\bar{x} \pm 1.96 \frac{\sigma}{\sqrt{n}}\sqrt{\frac{N-n}{N-1}}$

t for μ: $\bar{x} \pm t_{DF=n-1} \frac{s}{\sqrt{n}}$

NEVER USE FPC $\simeq 1$ FOR NEARLY NORMAL POPN

Look at two pops.

3 CI for $\mu_1 - \mu_2$

#1. 95% CI for $\mu_1 - \mu_2$: ← avg # rings sample of trees

Rely upon $Var(X \ominus Y) = {}_{INDEP} Var X \oplus Var Y$

Apply to $Var(\bar{X}_1 \ominus \bar{X}_2) = Var \bar{X}_1 \oplus Var \bar{X}_2$

$$(\bar{X}_1 - \bar{X}_2) \pm 1.96 \sqrt{\sigma_1^2/n_1 \oplus \sigma_2^2/n_2}$$

est'd S.D. of $\bar{X}_1 - \bar{X}_2$

Plot 1.

Suppose $\bar{X}_1 = (\text{NOD } 87.44)\ 68.22$

$\sigma_1 =$ 24.33

$n_1 = 100$

$N_1 = 4000$ only in play if sample without repl.

Plot 2.

$\bar{X}_2 = 74.61$

$\sigma_2 = 31.62$

$n_2 = 50$

$N_2 = 2000$

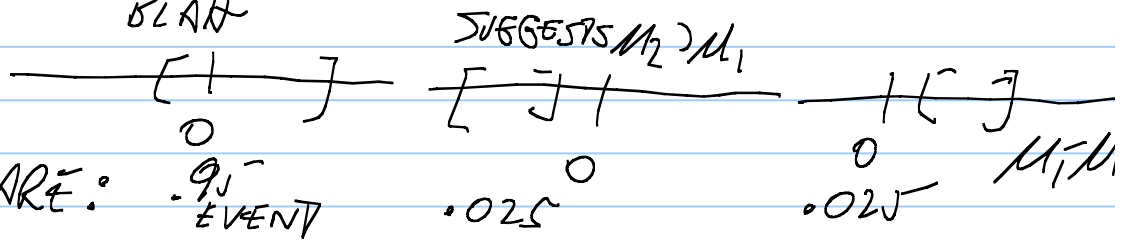
1c. 95% CI for $\mu_1 - \mu_2$ is: $(68.22 - 74.61) \pm 1.96 \sqrt{\frac{24.33^2}{100} \oplus \frac{31.62^2}{50}}$

1a. $68.22 \pm 1.96 \frac{24.33}{\sqrt{100}}$

1b. W/o Repl: $(68.22 - 74.61) \pm 1.96 \sqrt{\frac{24.33^2}{100}\frac{4000-100}{4000-1} \oplus \frac{31.62^2}{50}\frac{2000-50}{2000-1}}$

1e. IF $\mu_1 = \mu_2 \Rightarrow \mu_1 - \mu_2 = 0$ IN WHICH CASE HAS OUR CI

1f. COVERED $\mu_1 - \mu_2$? Ck $\mathcal{H}$.



IF $\mu_1 = \mu_2$ THE PROBABILITIES ARE:

1g. SMALL n_1, n_2. PROVIDED

AS BEFORE CI $\bar{x}_1 - \bar{x}_2 \pm t$ (DF ??) $\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}$

I WILL GIVE APPLICABLE DF.

DF

CONF | 95%

$DF[n_1, n_2, s_1, s_2)$

MAY NOT BE INTEGER SO ROUND DOWN. (TO BE CONSERVATIVE)

2. O-1 DATA.

SOIL TYPE 1 44 of 120 "LATE DEVELOPMENT" (ANTHILLS) $N_1 = 1800$

MOISTURE? —

2 38 of 160 $N_2 = 1400$

SAMPLING UNIT IS AN ANTHILL.

2d. WITHOUT REPL. 2-BASED 95% CI for $p_1 - p_2$

$$\hat{p}_1 - \hat{p}_2 \pm 1.96 \sqrt{\frac{\frac{44}{120}\frac{76}{120}}{120}\frac{1800-120}{1800-1} + \frac{\frac{38}{160}\frac{122}{160}}{160}\frac{1400-160}{1400-1}}$$

FPC_1^2 FPC_2^2

#3. Pop1 & Pop2 ARE ~ NORMAL. 1: 3.24 3.15 3.21
2: 4.13 5.02 5.82

95% t-BASED CI:

DF	t_{DF}
2	
CONF	95%

FORMULA DF = 2.54 ⇒ DF = 2

$$\bar{x}_1 - \bar{x}_2 \pm t_{DF=2} \sqrt{\frac{s_1^2}{3} + \frac{s_2^2}{3}}$$

$17.6/3$

No FPC w/t.

CALC. $s_1 = \sqrt{\frac{(3.24 - \frac{17.6}{3})^2 + (3.15 - \frac{17.6}{3})^2 + (3.21 - \frac{17.6}{3})^2}{3-1}}$

s_2 likewise