ST2334 - Tutorial 10

$$T = \frac{(\bar{X} - M)}{S/\sqrt{n}} = \frac{\bar{X} - 20}{4 \cdot 1/\sqrt{n}} \sim t(8)$$

Pr(52 > 9.1) = Pr(452 > 36.4)

 $\frac{|S_1|^2/\sigma_1^2}{|S_2|^2/\sigma_2^2} = \frac{|S_1|^2}{|S_2|^2} \sim F(|\tau_1|^2)$

Pr (S12/S22 < 4.59) = 0.990

$$\sigma_{\tilde{x}_{6}-\tilde{x}_{A}} = \sqrt{\sigma_{8}^{2}/s_{6} + \sigma_{A}^{2}/s_{6}}$$

$$= \sqrt{s_{6}^{2}/s_{6} + s_{6}^{2}/s_{6}}$$

$$= \sqrt{\frac{1}{18}} \qquad 0.2357^{2}$$

$$\therefore \quad \overline{X}_{8} - \overline{X}_{A} \sim N(0, \frac{1}{18})$$

$$\begin{array}{ll} \vdots & \overline{X}_{B} - \overline{X}_{A} \sim N(0, \frac{1}{18}) \\ P_{P}(\overline{X}_{B} - \overline{X}_{A} \gg 0.2) &= 0.198 \end{array}$$

= 0.05

(b). Pr (3.462 < 52 < 10.745) = Pr (13.848 < 452 < 42.98)

= 0.49 - 0.05 = 0.94

$$\frac{(n-1)S^2}{\sigma^2} = \frac{24S^2}{6} = 4S^2 \sim \chi^2(24)$$

3 (a).

?

$$\frac{(\bar{x}-m)}{s/\bar{x}} = \frac{\bar{x}-20}{4\cdot1/\sqrt{3}} \sim$$

Week 12

$$E(V) = E(\frac{X + N/2}{3N/2}) = \frac{E(X)}{3N/2} + \frac{1}{3} = \frac{NP}{3N/2} + \frac{NP}{3N/2} + \frac{1}{3} = \frac{NP}{3N/2} + \frac{1}{3} = \frac{NP}{3N/2} + \frac{1}{3} = \frac{NP}{3N/2} + \frac{1}{3} = \frac{NP}{3N/2} + \frac{NP}{3$$

$$E(v) = E(\frac{x + n/2}{3n/2}) = \frac{E(x)}{3n/2} + \frac{1}{3} = \frac{np}{3n/2} +$$

$$E(V) = E(\frac{3n/2}{3}) = \frac{3n/2}{3n/2} + \frac{3}{3} = \frac{3n/2}{3n/2}$$

$$E(v) = E(\frac{x+\sqrt{2}}{3n/2}) = \frac{20\sqrt{2}}{3n/2} + \frac{1}{3} = \frac{\sqrt{2}}{3n/2}$$

$$E(V) = E(\frac{\sqrt{+4/2}}{3n/2}) = \frac{200}{3n/2} + \frac{1}{3} = \frac{np}{3n/2}$$

 $\bar{x} - \bar{\epsilon}_{\alpha/2} \left(\frac{\sigma}{\sqrt{h}} \right) < M < \bar{x} + \bar{\epsilon}_{\alpha/2} \left(\frac{\sigma}{\sqrt{h}} \right)$ $4.85 - 1.960 \left(\frac{0.95}{\sqrt{10}} \right) < M < 4.85 + 1.960 \left(\frac{0.95}{\sqrt{20}} \right)$

 $\frac{1}{4}$ (a). $\frac{1}{8}$ = 0.75 α = 0.05 μ = 20 $\frac{1}{2}$ = 4.85

4.521 < 14 < 5.179

n = 54 0225

(b). $Z_{A/2}\left(\frac{\sigma}{\sqrt{n}}\right) = 0.20$

(c). $T = \frac{(\bar{X} - M)}{5/\sqrt{m}} \sim t(19)$

8 (4)

(b)

 $1.960\left(\frac{0.35}{\sqrt{n}}\right) = 0.20$

 $n \geqslant \left(\frac{\sigma}{2n/\epsilon} \frac{\sigma}{\epsilon} \right)^{\frac{1}{\epsilon}}$ $= \left(1.960 \left(\frac{0.0015}{0.0005} \right) \right)^{2}$

= 34.5744 .. n = 35

$$E(V) = E\left(\frac{X + N/2}{3N/2}\right) = \frac{E(X)}{3N/2} + \frac{1}{3} = \frac{Np}{3N/2}$$

(b)
$$E(V) = E(\frac{X+n/2}{3n/2}) = \frac{E(X)}{3n/2} + \frac{1}{3} = \frac{np}{3n/2} + \frac{1}{3} = \frac{2p}{3} + \frac{1}{3} \neq p$$

$$F(y) = F(\frac{X + n/2}{2}) = \frac{E(X)}{2} + \frac{1}{3} = \frac{np}{2}$$

$$= (X + n/2) \qquad E(X) \qquad 1 \qquad np$$

$$(X+n/2)$$
 $E(X)$ A

$$E(u) = E(x/n) = E(x)/n = np/n = p$$

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 $\bar{z} - t_{N-1;\alpha/2} \left(\frac{s}{\sqrt{n}} \right) < M < \bar{x} + t_{N-1;\alpha/2} \left(\frac{s}{\sqrt{n}} \right)$ $4.85 - 2.093 \left(\frac{0.95}{\sqrt{20}} \right) < M < 4.85 + 2.093 \left(\frac{0.95}{\sqrt{20}} \right)$

 $\overline{x} - z_{o/2} \left(\frac{\sigma}{\sqrt{n}} \right) < M < \overline{x} + z_{o/2} \left(\frac{\sigma}{\sqrt{n}} \right)$ $0.310 - 1.960 \left(\frac{0.0015}{\sqrt{75}} \right) < M < 0.310 + 1.960 \left(\frac{0.0015}{\sqrt{75}} \right)$

0.30966 < M < 0.31033

4.498 < M < 5.202

O = 0.0015 N= 75 X= 0.310 X = 0.05

$$6(a)$$
 $E(u) = E(x/n) = E(x)/n = np/n = p$

$$(x/n) = E(x)/n = np/n = p$$

$$N = 12, \quad \overline{x} = 48.50, \quad S = 1.5, \quad \alpha = 0.1$$

$$\overline{x} - t_{n-1}, \alpha/2 \left(\frac{S}{\sqrt{n}} \right) < M < \overline{x} + t_{N-1}, \alpha/2 \left(\frac{S}{\sqrt{n}} \right)$$

$$48.50 - 1.746 \left(\frac{1.5}{\sqrt{12}} \right) < M < 48.50 + 1.746 \left(\frac{1.5}{\sqrt{12}} \right)$$

10.
$$M_1 = 25$$
, $\sigma_1 = 5$, $\overline{x}_1 = 80$

$$M_2 = 36$$
, $\sigma_2 = 3$, $\overline{x}_2 = 35$

$$\overline{x}_1 - \overline{x}_2 - \overline{x}_{2k_2} \sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}} < M < \overline{x}_1 - \overline{x}_2 + \overline{x}_{2k_2} \sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}}$$

11. n = 100, $\bar{x} = 12.2$, S = 1.1, O = 0.2 $n_2 = 200$, $\bar{x}_2 = 9.1$, $S_2 = 0.9$

12.

 $90 - 75 - 1881\sqrt{\frac{5^2}{25} + \frac{3^2}{36}} < M < 90 - 75 + 1881\sqrt{\frac{5^2}{25} + \frac{3^2}{36}}$

By C.L.T. CI: $\overline{x}_1 - \overline{x}_2 - \overline{z}_{k/2} \sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}} < M < \overline{x}_1 - \overline{x}_2 + \overline{z}_{k/2} \sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}}$

2.804 < M < 3.396

 $|2.2-9.1-2.326\sqrt{\frac{1.1^2}{100}+\frac{0.9^2}{200}}$ < M < $|2.2-9.1+2.326\sqrt{\frac{1.1^2}{100}+\frac{0.9^2}{200}}$

M = M, -M2 > 0, so (Yes

2.897 < M < 7.103

$$\left(\frac{1.5}{\sqrt{12}}\right) < M < 48.50$$

$$\left(\frac{1.5}{\sqrt{12}}\right) < M < 2 + \frac{1}{\sqrt{12}}$$

$$\left(\frac{1}{n}\right) < u < \bar{x} + t_{n-1}$$

$$)<\mu<\bar{\mu}+t_{\mu-1;i}$$

$$\int_{0}^{\infty} \frac{1}{s} \left(\frac{1}{s} + \frac{1}{s} \right) < M < \sqrt{s} + \frac{1}{s} + \frac{1}{s}$$