7.6.1

$n = 8$

$\bar{x} = 3.0$

(a) $\bar{x} \pm \lambda_{0.025} \cdot \frac{0.6}{\sqrt{8}}$

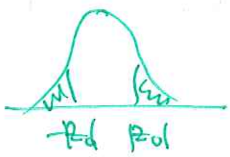
(b) $s = 0.56$

$\bar{x} \pm t_{0.025}(7) \cdot \frac{0.56}{\sqrt{8}}$

(c) $t = \frac{\bar{x} - \mu}{s/\sqrt{n}}$ gränser $t_{0.025}(7)$

$= \frac{-0.2}{0.56/\sqrt{8}}$

(d) $z_0 = \frac{-0.2}{0.56/\sqrt{8}}$



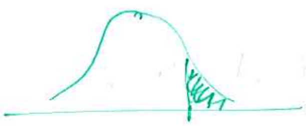
$p = 2(1 - \Phi(|z_0|))$

7.6.3 . $n = 10$ $\bar{x} = 0.528$

$s = 0.194$

(a) $t = \frac{\bar{x} - 0.5}{s/\sqrt{10}}$ gränser $t_{0.025}(9)$

(b)



$t_{0.05}(9)$

(c)

$-t_{0.05}(9)$

$s = 0.194 \qquad n = 10$

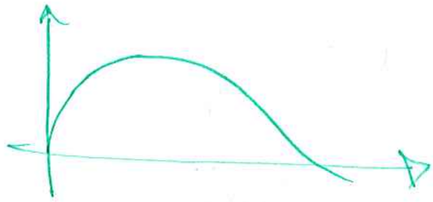
7.6.5. ~~Teststorhet~~ KI för σ

$$I_\sigma = \left(s\sqrt{\frac{n-1}{\chi^2_{\alpha/2}(n-1)}} \, , \, s\sqrt{\frac{n-1}{\chi^2_{1-\alpha/2}(n-1)}} \right)$$

(a) $\chi^2_{0.025}(9)$ och $\chi^2_{\cancel{0.025}\ 0.975}(9)$

(b)

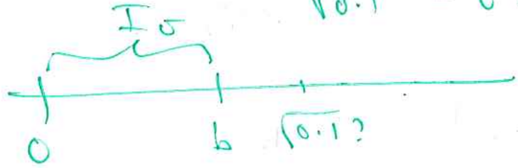
$$I_\sigma = \left(0, s\sqrt{\frac{n-1}{\chi^2_{1-\alpha}(n-1)}} \right)$$



$\chi^2_{0.99}(9) =$

Tror på H_1 om $\sqrt{0.1} \notin I_\sigma$

$\sqrt{0.1} = 0.316$



$$I_\sigma = \left(0, 0.194 \cdot \sqrt{\frac{9}{2.09}} \right) = (0, 0.403)$$

$\sigma_0 \in I_\sigma$; kan ej förkasta

(c)

$$I_\sigma = \left(s\sqrt{\frac{n-1}{\chi^2_\alpha(9)}} \, , \, \infty \right)$$

$$= \left(0.194\sqrt{\frac{9}{21.666}} \, , \, \infty \right) = (0.125, \infty)$$

$0.1 = \sigma_0 \notin I_\sigma \Rightarrow$ förkasta

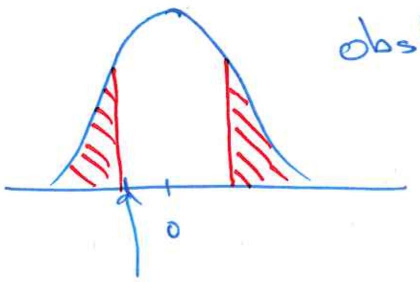
7.6.1

(d) $\bar{x} = 3.0$

$\sigma = 0.6$

$n = 8$

$$z_0 = \frac{\bar{x} - 3.2}{0.6/\sqrt{8}} = -0{,}94 \longrightarrow$$



$z_0 = -0{,}94$

obs! 2-sidigt test.

$$\begin{aligned} \text{p-värdet} &= \text{röda ytan} \\ &= 2(1 - \Phi(0{,}94)) \\ &= 2(1 - 0.8264) \\ &= 0.3472 \end{aligned}$$

7.6.7

(b) Två alternativ:

(i) Bilda 99% konfidensgrad KI, $I_{\mu_1-\mu_2}$

(ii) Hypotestest med

$$T_0 = \frac{(\bar{X}^{(1)} - \bar{X}^{(2)}) - (\mu_1 - \mu_2)}{s\sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}$$

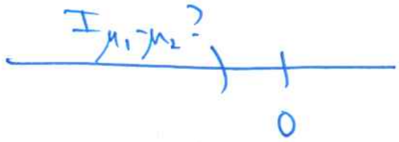
där s = sammanvägn. av s_1, s_2.

$n_1 = 5$
$n_2 = 6$

Båda ger samma. Enklare med (i).

Vill visa $\mu_1 < \mu_2$ dvs $\mu_1 - \mu_2 < 0$

Så tar KI av formen



$$\begin{aligned} I_{\mu_1-\mu_2} &= \left(-\infty,\ (\bar{x}^{(1)} - \bar{x}^{(2)}) + t_\alpha(n_1+n_2-2)\, s\sqrt{\frac{1}{n_1} + \frac{1}{n_2}}\right) \\ &= \left(-\infty,\ -1.801 + \underbrace{t_{0.01}(9)}_{2.82} \cdot 2{,}025 \cdot \sqrt{\frac{1}{5} + \frac{1}{6}}\right) \\ &= (-\infty,\ 1.66) \end{aligned}$$

täcker 0: ej signifikant

7.36.

grupp 1 : 60% $p_0 = 0.6$

Testvar: $z_0 = \dfrac{\hat{p} - p_0}{\sqrt{\dfrac{p_0(1-p_0)}{n}}} \approx N(0,1)$, om H_0 korr.

$0.75 - 0.6 = 0.15$

$\alpha = 0.05$

och $1-\beta = 0.9$ (för $p = 0.75$)

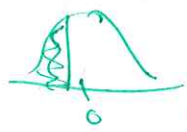
$\beta = P_p(\text{behåll } H_0)$

$$0.1 = \beta = P_{p=0.75}\left(z_0 \le \lambda_{0.05}\right)$$

$$= P\Bigg(\underbrace{\frac{\hat{p}-p}{\sqrt{\frac{p_0(1-p_0)}{n}}}}_{\approx N(0,1)} + \frac{p-p_0}{\sqrt{\frac{p_0(1-p_0)}{n}}} \le \lambda_{0.05}\Bigg)$$

$$\approx \Phi\Bigg(\underbrace{\lambda_{0.05} - \frac{0.15}{\sqrt{\frac{0.6\cdot 0.4}{n}}}}_{<0}\Bigg)$$

~~Skissa~~ du



$$= 1 - \Phi\left(\frac{0.15\sqrt{n}}{\sqrt{0.6\cdot 0.4}} - \lambda_{0.05}\right)$$

$$\Phi\left(\frac{0.15\sqrt{n}}{\sqrt{0.6\cdot 0.4}} - \lambda_{0.05}\right) = 0.9$$

$$\Rightarrow \frac{0.15\sqrt{n}}{\sqrt{0.6\cdot 0.4}} - \lambda_{0.05} = \lambda_{0.1}$$

$$\sqrt{n} \ge \frac{\sqrt{0.24}\,(\lambda_{0.1} + \lambda_{0.05})}{0.15} = 9.54$$

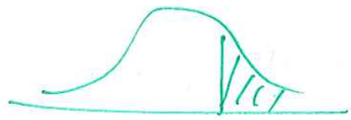
$$\underline{\underline{n \ge 90.9}}$$

obs! Boken använder tabeller så lite olika svar.

7.6.10.

$n = 8$

z = diff.



$\bar{z} = 0.525$ obs. av $N(\Delta, \sigma^2)$

$s_z^2 = 0.119$

$$t = \frac{\bar{z} - \Delta_0}{s_z / \sqrt{8}}$$

gräns

$= \cancel{12.74} = 4.30$

$t_{0.01}(9)$

$= 2.82$

Förkasta H_0.

7.6.11

Skillnader

$z = (11, 15, 0, 5, 2, 6, -6, 6, -5, 14)$

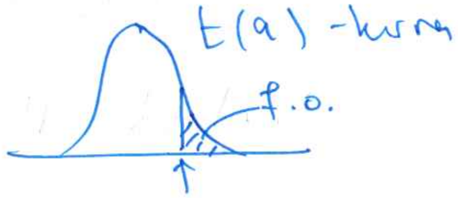
$n = 10$

stickprov ur $N(\Delta, \sigma^2)$ (okänd σ^2)

Fog för klagomål om brist kan påvisas:

$H_1 : \Delta > \Delta_0 = 0$

$H_0 : \Delta \leq \Delta_0 = 0$



$t_{0.05}(9) = 1.83$

Värden:

$\bar{z} = 4.8$

$s = 7.25$

Observation $\quad t = \dfrac{\bar{z} - \Delta_0}{s/\sqrt{n}} = \dfrac{4.8}{7.25/\sqrt{10}} = 2.09.$

7/6-40

8.2.1.

klasser 1, 2, ..., 10 :

i:	1	2	3	4	5	6	7	8	9	10 = k
O_i =	19	27	20	22	19	18	18	16	22	19
E_i =	20 för alla i									

$$y = \sum_{i=1}^{10} \frac{(O_i - E_i)^2}{E_i}$$

$$= \frac{1}{20} \sum_{i=1}^{10} (O_i - 20)^2$$

$$= \frac{1}{20} \left(1^2 + 7^2 + 0 + 2^2 + 1^2 + 2^2 + 2^2 + 4^2 + 2^2 + 1^2 \right)$$

$$= 4.2.$$

Gräns: $\chi^2_{0.05}(9) = 16.9$

ej förkasta

8.2.2

tot area = 1000

	A $p_A = 0.1$	B $p_B = 0.2$	C $p_c = 0.3$	D $p_D = 0.4$	
O:	13	25	30	31	tot = 99
E:	9.9	19.8	29.7	39.6	

$$E_i = p_i \cdot 99$$

$$q = \frac{(13-9.9)^2}{9.9} + \frac{(25-19.8)^2}{19.8} + \frac{(30-29.7)^2}{29.7} + \frac{(31-39.6)^2}{39.6}$$

$$= 4.207$$

$$\chi^2_{0.05}(3) = 7.81$$

Nej, behåll H_0

801.

$$7 : 3 : 6 : 2$$

$$= \cancel{\frac{7}{9} : \frac{3}{9} : \frac{6}{9} : \frac{2}{9}}$$

$$= \frac{1}{12} : \frac{3}{12} : \frac{6}{12} : \frac{2}{12}$$

	I	II	III	IV
O_i	35	140	228	77
E_i	40	120	240	80

$$E_i = p_i \cdot 480$$

$$q = \frac{(35-40)^2}{40} + \cdots + \frac{(77-80)^2}{80}$$

$$= 4.67.$$

$\chi^2_{0.05}(3) = 7.81$ behåll H_0.

~~802~~

803.

$Po(\lambda)$?

i	0	1	2	≥ 3	
O_i	109	65	22	4	tot = 200
E_i	108.7	66.3	20.2	4.8	

$$\hat{\lambda} = \text{snitt} = 0 \cdot \frac{109}{200} + 1 \cdot \frac{65}{200} + 2 \cdot \frac{22}{200} + 3 \cdot \frac{3}{200} + 4 \cdot \frac{1}{200}$$

$$= 0.61$$

$$E_i = e^{-0.61} \frac{(0.61)^i}{i!} \cdot 200 \quad \text{för } i \leq 2$$

$$E_{\geq 3} = 200 - \text{resten} = 4.8$$

$$g = 1 \quad \text{så} \quad \chi^2_{0.05}(4-1-1) = 5.99.$$

$$q = 0.32$$

behåll H_0

9.2.3. $\beta^* = \frac{S_{xy}}{S_{xx}}$ $\alpha^* = \bar{y} - \beta^* \bar{x}$.

9.2.4. Samma.

9.2.5.

två-sid. $\begin{cases} I_\beta = \left(\beta^* \pm t_{0.05}(n-2)\, s_r / \sqrt{S_{xx}}\right) \\ I_\alpha = \left(\alpha^* \pm t_{0.05}(n-2)\, s_r \sqrt{\frac{\sum x_i^2}{n S_{xx}}}\right) \end{cases}$

annars $I_\beta = \left(\beta^* - t_{0.1} \frac{(n-2) s_r}{\sqrt{S_{xx}}}, \infty\right)$

$I_\alpha = \left(\alpha^* - t_{0.1}\, s_r \sqrt{\frac{\sum x_i^2}{n S_{xx}}}, \infty\right)$.

9.2.7 Samma.

901-902. Samma