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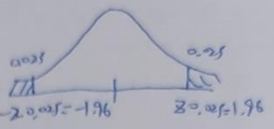
例7.3 ① $H_0 = 20$、$H_1 \neq 20$

② $\alpha = 0.05$, $\frac{\alpha}{2} = 0.025$

$z_{0.025} = 1.96$



$\frac{20.563 - 20}{\frac{2.35}{\sqrt{64}}} = \frac{0.563}{0.29375} = 1.917$

不拒絕 H_0 ∋ 平均每週上網?小時

例7.4 P－值 $= 2P(z > 1.917)$

$\cong 2P(z > 1.91)$

$= 2 \times 0.0281$

$= 0.0562 > \alpha$

所以，不棄卻虛無假設

例7.5

75 80 65 50
45 50 60 64
55 58 63 68
38 66 70 62

$\mu = 59.3125$

① $H_0 : \mu \leq 55$、$H_1 : \mu > 55$

② $\alpha = 0.05$, $\frac{\alpha}{2} = 0.025$

③ $t_{0.05}(15) =$

$s = \frac{92.326911746}{7}$

$= 13.189$

$\frac{59.3125 - 55}{\frac{13.189}{\sqrt{16}}} \fallingdotseq 1.308$

例7.6 ① $H_0 : \mu_1 - \mu_2 \geq 0$
$H_1 : \mu_1 - \mu_2 < 0$

② $\alpha = 0.05$

③ $C = \{ z < -z_\alpha \} = \{ z < -1.645 \}$

④ $z = \frac{\bar{x} - \bar{y}}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}} = \frac{6.98 - 7.20}{\sqrt{\frac{0.78^2}{200} + \frac{0.75^2}{180}}} = \frac{-0.22}{0.076167} = -2.801$

不拒絕 ∋ 男學生平均睡眠時間少於女學生

Double A

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例7.7

① $H_0: \mu_1 - \mu_2 = 0$ $H_1: \mu_1 - \mu_2 \neq 0$

② $\alpha = 0.05$

③ $C = \{|T| > t_{0.025}(16)\} = 2.12$

④ $S_p = \sqrt{\dfrac{9 \times 0.65^2 + 7 \times 0.67^2}{10+8-2}} = 0.642$

$$\begin{array}{r} 7.728 \\ -7.546 \\ \hline 0.182 \end{array}$$

$$T = \frac{7.728 - 7.546}{0.642\sqrt{\frac{1}{10}+\frac{1}{8}}} = \frac{0.182}{0.3045273187} \doteq 0.598$$

接受H_0，沒有顯著差異

例7.8

① $H_0: \mu_1 - \mu_2 = 0$, $H_1: \mu_1 - \mu_2 \neq 0$

② $\alpha = 0.05$

③ $$V = \frac{\left(\frac{4.82^2}{12} + \frac{8.54^2}{15}\right)^2}{\frac{\left(\frac{4.82^2}{12}\right)^2}{12-1} + \frac{\left(\frac{8.54^2}{15}\right)^2}{15-1}} = \frac{46.2147074596}{2.0291249647} \doteq 22.773 \doteq 23$$

$C = \{|T| > t_{0.025}(23)\} = \{|T| > 2.069\}$。

$$\begin{array}{r} 78.25 \\ -72.6 \\ \hline 5.65 \end{array}$$

④ $$T = \frac{78.25 - 72.6}{\sqrt{\frac{4.82^2}{12} + \frac{8.54^2}{15}}} = \frac{5.65}{2.607324299} = 2.167$$

接受H_0，沒有顯著差異

Double A