공학통계 과제

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#9-2

$n=30,\ \bar{x}=780,\ \sigma=40$

$z_{0.02}=2.054$

$$780-(2.054)(40/\sqrt{30})<\mu<780+(2.054)\cdot(40/\sqrt{30})$$

$$\therefore 765<\mu<795$$

#9-6

$$n=\left[\frac{2.05\times40}{10}\right]^2=\underline{68}$$

#9-9

$n=20,\ \bar{x}=11.3,\ S=2.45$

$V=19 \rightarrow t_{0.025}=2.093$

$$11.3-(2.093)(2.45/\sqrt{20})<\mu<11.3+(2.093)(2.45/\sqrt{20})$$

$$\therefore 10.15<\mu<12.45$$

#9-12

$n=10,\ \bar{x}=230,\ S=15,$

$V=9 \rightarrow t_{0.025}=3.25$

$$230-(3.25)(15/\sqrt{10})<\mu<230+(3.25)(15/\sqrt{10})$$

$$\therefore 214.58<\mu<245.42$$

9-17

$n=20,\ \bar{x}=11.3,\ S=2.45$

$V=19 \rightarrow t_{0.025}=2.093$

$$11.3 \pm (2.093)(2.45)\sqrt{1+1/20} = 11.3 \pm 5.25$$

$$\therefore (6.05,\ 16.55)$$

9-22

$n=50,\ \bar{x}=78.3,\ S=5.6$

$V=49 \sim t_{0.05}=1.677$

$$78.3-(1.677)(5.6)\sqrt{1+1/50} \Rightarrow 68.91$$

$1-\alpha=0.95,\ \gamma=0.01,\ n=50$

$\therefore k=2.269$

$$\therefore \bar{x}-ks=(78.3)-(2.269)(5.6)=65.59$$

68.91 & 65.59

9-35

$n_1=25 \quad \bar{x}_1=80 \quad \sigma_1=5 \quad z_{0.03}=1.88$

$n_2=36 \quad \bar{x}_2=75 \quad \sigma_2=3$

$$(80-75)-(1.88)\sqrt{25/25+9/36} < \mu_1-\mu_2 < (80-75)+(1.88)\sqrt{25/25+9/36}$$

$$2.9 < \mu_1-\mu_2 < 7.1$$

#9-39

$n_1=12 \quad \bar{x}_1=84 \quad s_1=4$

$n_2=18 \quad \bar{x}_2=77 \quad s_2=6$

$$s_p=\sqrt{\frac{(n_1-1)s_1^2+(n_2-1)s_2^2}{n_1+n_2-2}}$$

$$=5.305$$

$v=28 \rightarrow t_{0.005}=2.763$

$$(84-77)\pm(2.763)(5.305)\sqrt{1/12+1/18}$$

$$=7\pm5.46$$

$$1.54<\mu_1-\mu_2<12.46$$

#9-43

$n_A=12 \quad \bar{x}_A=36300 \quad s_A=5000$

$n_B=12 \quad \bar{x}_B=38100 \quad s_B=6100$

$$v=\frac{\left(\frac{5000^2}{12}+\frac{6100^2}{12}\right)^2}{\frac{\left(\frac{5000^2}{12}\right)^2}{11}+\frac{\left(\frac{6100^2}{12}\right)^2}{11}}=21$$

$v=21 \rightarrow t_{0.025}=2.08$

$$(36300-38100)\pm(2.08)\cdot\sqrt{\frac{5000^2}{12}+\frac{6100^2}{12}}$$

$$=-1800\pm4736$$

$$-6536<\mu_A-\mu_B<2936$$

9-44

$n=8,\ \bar{d}=-1112.5 \quad s_d=1454.$

$v=7 \rightarrow t_{0.005}=3.499$

$$-1112.5 \pm (3.499)\times\frac{1454}{\sqrt{8}} = -1112.5 \pm 1798.7$$

$$-2911.2 < \mu_D < 686.2$$

9-54

$n=500. \rightarrow \hat{p}=\frac{485}{500}=0.97,\ \hat{q}=0.03$

$z_{0.05}=1.645$

$$0.97 \pm (1.645)\sqrt{\frac{0.97\times 0.03}{500}}$$

$$= 0.97 \pm 0.013$$

$$0.957 < p < 0.983$$

9-65

$n_1=1000 \quad \hat{p}_1=0.25 \quad z_{0.025}=1.96$

$n_2=1000 \quad \hat{p}_2=0.275$

$$(0.275-0.25) \pm (1.96)\sqrt{\frac{0.25\times 0.75}{1000}+\frac{0.275\times 0.725}{1000}}$$

$$= 0.025 \pm 0.039 \qquad -0.014 < p_2-p_1 < 0.064$$

9-71

$s^2 = 0.815 \ (v = 4)$ $\quad \chi^2_{0.025} = 11.143$, $\chi^2_{0.975} = 0.484$

$$\frac{4 \times (0.815)}{11.143} < \sigma^2 < \frac{4 \times 0.815}{0.484}$$

$$0.293 < \sigma^2 < 6.736$$