11. 22V

1. $p=0,95$

ODREDI INTERVAL?

$\bar{x} = \frac{40+21+66+46+24+25}{10} = 22,2$

$\bar{x}=22,2$

NEPOZNATI PARAMETRI NORMALNE RAZDIOBE

$\sqrt{N}(a, \frac{\sigma^2}{n})$

$p=0,95$

$\alpha = 1-p = 0,05$

$1-\frac{\alpha}{2} = 0,975$

$t_{0,975} = 2,262$

$\hat{s}^2 = \frac{1}{9} \cdot (2 \cdot 2,22^2 + 1,22^2 + 0,22^2 + 0,8^2 + 1,8^2 + 2,8^2)$

$\hat{s} = 1,622$

$t_{0,975} \cdot \frac{1,622}{\sqrt{10}} = 1,16$

$P(21,04 < a < 23,36)$

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2. $n = 15$

$\bar{x} = \frac{-4-1+3+4+6+8+5}{15} = 1,4$

$p = 0,95$

$\alpha = 0,05$

$t_{1-\frac{\alpha}{2}} = t_{0,975}$

$t_{0,975} = 2,145$

$s^2 = \frac{1}{14} \cdot (23,12 + 5,76 + 3,92 + 0,48 + 0,72 + 5,12 + 13,52 + 12,96)$

$s = 2,164$

$t_{0,975} \cdot \frac{s}{\sqrt{n}} = 1,24$

$P(-0,16 < a < 2,64) = 0,95$

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3. $N(m, 4)$ (σ^2)

$\sigma^2 = 4 \Rightarrow \sigma = 2$

x_i	0	1	2	3	4
n_i	1	4	6	12	2

$\Rightarrow n = 25$

$p = 0.9 \quad \alpha = 0.1$

σ - poznato, a nepoznato

$p = 0.9 \quad u_{1-\frac{\alpha}{2}} = u_{0.95} = 1.645$

$\bar{x} = \frac{0 \cdot 1 + 4 + 12 + 36 + 8}{25} = 2,4$

$\bar{X} \sim N(a, \frac{4}{25})$

$u_{0.95} \cdot \frac{\sigma}{\sqrt{n}} = 1,645 \cdot \frac{2}{5} = 0.658$

$P(\bar{x} - 0.658 < a < \bar{x} + 0.658) = 0.9$

$P(1.742 < a < 3.058)$

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4. $n = 11$

6, 9.2, 9.8, 9.9, 10.3, 10.3, 10.9, 11.6, 11.8, 12.5 } 1.4

$\bar{x} = \frac{\Sigma}{n} = 10,5727$ $\Rightarrow$ OČEKIVANJE

$S^2 = \frac{1}{n-1} \sum_{i=1}^{n} (x_i - \bar{x})^2$

$S^2 = \frac{1}{10} \cdot (20.8849 + 1.8843 + 0.5929 + 0,4489 + 20.0729 + 0,1089 + 1,0609 + 1.5129 + 1,93 + 11,7649)$

$= \frac{40.3344}{10}$

$S = 2.008$

$t_{1-0.025} = t_{0.975} = 2.228$

$2.228 \cdot \frac{2.008}{\sqrt{11}} = 1.34$

$P(3.23 \leq a \leq 11.91) = 0.95$

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5. $\sigma = 0{,}5$ $\quad N(a,\ 0{,}5^2)$

$n = 8$

16, 16, 16, 16,2, 16,2, 16,2, 16,5, 16,5

$\bar{x} = 16{,}2$

$p = 0{,}9$ $\quad \bar{x} \sim N(a,\ \frac{0{,}5}{\sqrt{8}})$

$\alpha = 0{,}1$

$p = 0{,}9$

$u_{0{,}95} = 1{,}645$

$1{,}645 \cdot \frac{0{,}5}{\sqrt{8}} = 0{,}29$

$P(15{,}91 < a < 16{,}40) = 0{,}9$

6.

x_i	64	65	66	67	68
u_i	3	4	8	5	2

$n = 22$

$\bar{x} = \frac{\sum}{22} = 65{,}95$

$N(0, \sigma^2)$

$p = 1 - \alpha$

$p = 0{,}95$

$\alpha = 0{,}05$

$t_{0{,}975} = 2{,}080$

$s^2 = \frac{1}{21} \cdot (11{,}4075 + 3{,}61 + 0{,}02 + 5{,}5125 + 8{,}405)$

$\hat{\sigma} = 1{,}378$

$t_{0{,}975} \cdot \frac{1{,}378}{\sqrt{22}} = 0{,}611$

$P(65{,}339 \leq a < 66{,}561) = 0{,}9$

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7.

x_i	110	115	120	125	130	135
u_i	2	3	6	5	2	2

$n=20$

$\bar{x} = \frac{2440}{20} = 122$

$p=0,9$

$\alpha=0.1$

$n-1=19$

$t_{0.975} = 2.093$

$\hat{s}^2 = \frac{1}{19} \cdot (288+147+24+45+128+338)$

$\hat{s} = \sqrt{51.05} = 7,145$

$t_{0,975} \cdot \frac{7,145}{\sqrt{20}} = 2,093 \cdot \frac{7,145}{\sqrt{20}} = 3,343$

$P(\bar{x} - 3,343 < a < \bar{x} + 3,343) = 0,9$

$P(118.657 < a < 125,343) = 0.9$ – INTERVAL ZA OČEKIVANJE

$c_1 = \chi^2_{19,0.05}$ $\quad c_2 = \chi^2_{19,0,95}$

$p=0,9 \quad n-1=19$

$\chi^2_{19,0.05} = 10,117$ $\quad \chi^2_{19,0,95} = 30,144$

$\beta_1 = \frac{19 \cdot 51.05}{c_2}$ $\quad \beta_2 = \frac{19 \cdot 51.05}{c_1}$

$\beta_1 = 32,177$ $\quad \beta_2 = 95,873$

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$P(32,177 \leq \sigma^2 \leq 95,873) = 0,9$ – INTERVAL ZA DISPERZIJU

8. $N(a, 4)$

x_i	0	1	2	3	4	5
u_i	1	4	6	10	5	2

$u = 28$

$\bar{X} = \frac{\Sigma}{u} = \frac{0+4+12+30+20+10}{28} = 2.714$

$p = 0,9$

$\alpha = 0,1$

$\bar{X} \sim N(a, \frac{4}{28})$

$u_{0.95} = 1.645$

$u_{0,95} \cdot \frac{2}{\sqrt{28}} = 0,621$

$P(2,093 \leq a \leq 3,335) = 0.9$

9. $N(0, 3)$

x_i	0	1	2	3	4
u_i	1	5	8	10	3

$u = 27$

$p = 0.9$

$\alpha = 0.1$

$\bar{X} = \frac{0+5+16+30+12}{27} = 2,83\dot{3}$

$u_{0.95} = 1,645$

$1.645 \cdot \frac{\sqrt{3}}{\sqrt{27}} = 1,645 \cdot \sqrt{\frac{1}{9}} = \frac{1,645}{3} = 0,548\dot{3}$

$P(1.785 \leq a \leq 2.881\dot{6}) = 0,9$

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10. $n=200$

a) $p=0,95$

b) $p=0,99$

c) $\hat{p} = \frac{110}{200} = 0,55$ – procjena = 55%

$\left.\begin{matrix} p=0,95 \\ \alpha=0,05 \end{matrix}\right\} u_{1-\frac{0,05}{2}} = u_{0,975} = 1,960$

$$p_{1,2} = \hat{p} \pm u_{0,975} \cdot \sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$$

$$= 0,55 \pm 1,96 \cdot \sqrt{\frac{0,55 \cdot 0,45}{200}}$$

$$= 0,55 \pm 0,068$$

$p_1 = 0,482$

$p_2 = 0,618$

a) $\boxed{P(0,482 \leq p \leq 0,618) = 0,95}$

b) $\left.\begin{matrix} p=0,99 \\ \alpha=0,01 \end{matrix}\right\} u_{1-\frac{0,01}{2}} = u_{0,995} = 2,576$

$$p_{1,2} = \hat{p} \pm u_{0,995} \cdot \sqrt{\frac{0,55 \cdot 0,45}{200}}$$

$$= 0,55 \pm 2,576 \cdot \sqrt{1,2375 \cdot 10^{-3}}$$

$$= 0,55 \pm 0,0906$$

$p_1 = 0,4594$

$p_2 = 0,6404$

$P(0,4594 \leq p \leq 0,6404) = 0,99$

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c) s 'Wojom vjerojatnosti će biti izabran

$p = 0,999$

$u = 3,291$

$p_{1,2} = 0,55 \pm 3,291 \cdot \sqrt{\frac{0,55 \cdot 0,45}{200}}$

$p_1 = 0,55 - 0,115$

$p_1 = 0,435$

$p_2 = 0,665$

p da će biti izabran je (0,435, 0,665) valjda!

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