8

Lista 5 - Solução

Cap. 8 – Intervalos Estatísticos para uma Única Amostra

Ex. 1 (8.21):

a) $IC(\mu;1-\alpha)=\left[\bar{x}-z_{\alpha/2}\dfrac{\sigma}{\sqrt{n}};\ \bar{x}+z_{\alpha/2}\dfrac{\sigma}{\sqrt{n}}\right]\Rightarrow IC(\mu;0,99)=\left[\bar{x}-z_{0,005}\dfrac{\sigma}{\sqrt{n}};\ \bar{x}+z_{0,005}\dfrac{\sigma}{\sqrt{n}}\right]$

$$IC(\mu;0,99)\cong\left[13,77-2,58\frac{0,5}{\sqrt{11}};\ 13,77+2,58\frac{0,5}{\sqrt{11}}\right]\cong[13,38;14,16]$$

b) $IC(\mu;1-\alpha)=\left[\bar{x}-z_{\alpha/2}\dfrac{\sigma}{\sqrt{n}};\ \bar{x}+z_{\alpha/2}\dfrac{\sigma}{\sqrt{n}}\right]\Rightarrow IC(\mu;0,95)=\left[\bar{x}-z_{0,025}\dfrac{\sigma}{\sqrt{n}};\ \bar{x}+z_{0,025}\dfrac{\sigma}{\sqrt{n}}\right]$

$$IC(\mu;0,95)\cong\left[13,77-1,96\frac{0,5}{\sqrt{11}};\ 13,77+1,96\frac{0,5}{\sqrt{11}}\right]\cong[13,47;14,07]$$

c) Para $(1-\alpha)=0,95\Rightarrow n=\left(\dfrac{z_{\alpha/2}\sigma}{E}\right)^2\Rightarrow n=\left(\dfrac{z_{0,025}\sigma}{E}\right)^2\Rightarrow n=\left(\dfrac{1,96\times 0,5}{0,2}\right)^2\cong 24,01\cong 25$

d) Para $(1-\alpha)=0,95\Rightarrow n=\left(\dfrac{z_{\alpha/2}\sigma}{E}\right)^2\Rightarrow n=\left(\dfrac{z_{0,025}\sigma}{E}\right)^2\Rightarrow n=\left(\dfrac{1,96\times 0,5}{(0,1/2)}\right)^2=384,16\cong 385$

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Ex. 2 (8.36):

$$IC(\mu;1-\alpha)=\left[\bar{x}-t_{\alpha/2;n-1}\frac{s}{\sqrt{n}};\ \bar{x}+t_{\alpha/2;n-1}\frac{s}{\sqrt{n}}\right]$$

$$IC(\mu;0,95)=\left[\bar{x}-t_{0,025;15}\frac{s}{\sqrt{n}};\ \bar{x}+t_{0,025;15}\frac{s}{\sqrt{n}}\right]$$

$$IC(\mu;0,95)\cong\left[65,5773-2,131\frac{4,2255}{\sqrt{16}};\ 65,5773+2,131\frac{4,2255}{\sqrt{16}}\right]\cong[63,3262;67,8284]$$

Ex. 3 (8.57):

$$IC(\sigma^2;1-\alpha)=\left[\frac{(n-1)s^2}{\chi^2_{\alpha/2;n-1}};\ \frac{(n-1)s^2}{\chi^2_{1-\alpha/2;n-1}}\right]\Rightarrow IC(\sigma^2;0,95)=\left[\frac{(39-1)s^2}{\chi^2_{0,025;38}};\ \frac{(39-1)s^2}{\chi^2_{0,975;38}}\right]$$

$$IC(\sigma^2;0,95)\cong\left[\frac{38\times 0,629^2}{\chi^2_{0,025;40}};\ \frac{38\times 0,629^2}{\chi^2_{0,975;40}}\right]\cong\left[\frac{15,034}{59,34};\ \frac{15,034}{24,43}\right]$$

$$IC(\sigma^2;0,95)\cong[0,253;0,615]\Rightarrow IC(\sigma;0,95)\cong\left[\sqrt{0,253};\sqrt{0,615}\right]\cong[0,503;0,784]$$

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Ex. 4 (8.64):

a) $IC(p;1-\alpha)=\left[\hat{p}-z_{\alpha/2}\sqrt{\frac{\hat{p}(1-\hat{p})}{n}};\ \hat{p}+z_{\alpha/2}\sqrt{\frac{\hat{p}(1-\hat{p})}{n}}\right]$

$\hat{p}=18/50=0,36$ e, para $1-\alpha=0,95\Rightarrow z_{\alpha/2}=z_{0,025}=1,96$

$IC(p;0,95)\cong\left[0,36-1,96\sqrt{\frac{0,36(1-0,36)}{50}};\ 0,36+1,96\sqrt{\frac{0,36(1-0,36)}{50}}\right]$

$IC(p;0,95)\cong[0,23;0,49]$

b) $n=\left(\frac{z_{\alpha/2}}{E}\right)^2\hat{p}(1-\hat{p})\Rightarrow n=\left(\frac{1,96}{0,02}\right)^2 0,36(1-0,36)\cong 2212,8\cong 2213$

c) $n=\left(\frac{z_{\alpha/2}}{E}\right)^2 p(1-p)\Rightarrow n=\left(\frac{1,96}{0,02}\right)^2 0,5^2\cong 2401$