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Lista 5

Cap. 8 – Intervalos Estatísticos para uma Única Amostra

Ex. 1 (8.21):

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

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

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

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

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

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

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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):

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

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

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

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Ex. 4 (8.64):

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

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

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

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

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

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