

Chapter 8: Statistical intervals for a single sample

Dạng 1: Confidence interval for μ (σ is known)

100(1- α)% *confidence interval* for μ is:

$$\bar{x} - z_{\alpha/2} \frac{\sigma}{\sqrt{n}} < \mu < \bar{x} + z_{\alpha/2} \frac{\sigma}{\sqrt{n}}$$

100(1- α)% *upper-confidence bound* for μ is:

$$\mu \leq \bar{x} + z_{\alpha} \frac{\sigma}{\sqrt{n}}$$

100(1- α)% *lower-confidence bound* for μ is:

$$\mu \geq \bar{x} - z_{\alpha} \frac{\sigma}{\sqrt{n}}$$

Dạng 2: Confidence interval for μ (σ is unknown)

100(1- α)% *confidence interval* for μ is:

$$\bar{x} - t_{\alpha/2, n-1} \frac{s}{\sqrt{n}} \leq \mu \leq \bar{x} + t_{\alpha/2, n-1} \frac{s}{\sqrt{n}}$$

100(1- α)% *upper-confidence bound* for μ is:

$$\mu \leq \bar{x} + t_{\alpha, n-1} \frac{s}{\sqrt{n}}$$

100(1- α)% *lower-confidence bound* for μ is:

$$\mu \geq \bar{x} - t_{\alpha, n-1} \frac{s}{\sqrt{n}}$$

Dạng 3: Confidence interval for p

100(1- α)% *confidence interval* for p is:

$$\hat{p} - z_{\alpha/2} \sqrt{\frac{\hat{p}(1 - \hat{p})}{n}} \leq p \leq \hat{p} + z_{\alpha/2} \sqrt{\frac{\hat{p}(1 - \hat{p})}{n}}$$

100(1- α)% *upper-confidence bound* for p is:

$$p \leq \hat{p} + z_{\alpha} \sqrt{\frac{\hat{p}(1 - \hat{p})}{n}}$$

100(1- α)% *lower-confidence bound* for p is:

$$p \geq \hat{p} - z_{\alpha} \sqrt{\frac{\hat{p}(1 - \hat{p})}{n}}$$

Dạng 4: The *required sample size* that the error estimating $|\bar{x} - \mu|$ not exceed E is:

$$n = \left\lceil \left(\frac{z_{\alpha/2} * \sigma}{E} \right)^2 \right\rceil$$

Dạng 5: The *required sample size* that the error estimating $|\hat{p} - p|$ not exceed E is:

$$n = \left\lceil \left(\frac{z_{\alpha/2}}{E} \right)^2 p(1 - p) \right\rceil$$