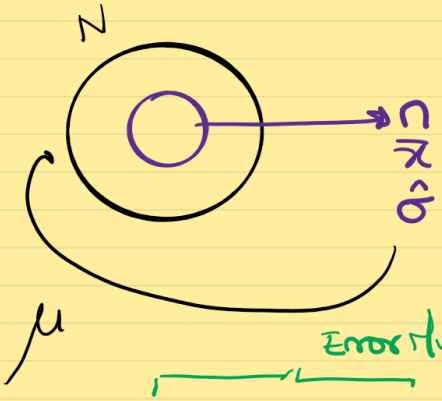
Estimación de Promedios
Población Finita



$n \geq 30$

Población Normal

$$\bar{x} - E \leq \mu \leq \bar{x} + E$$

Error Muestral

$$\bar{x} - \frac{Z_t \sigma}{\sqrt{n}} \cdot \sqrt{\frac{N-n}{N-1}} \leq \mu \leq \bar{x} + \frac{Z \cdot \sigma}{\sqrt{n}} \sqrt{\frac{N-n}{N-1}}$$

Ej:

$N = 1500$

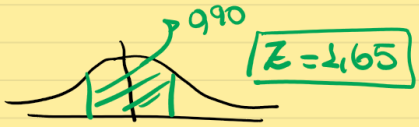
$n = 300$

$\bar{x} = 16$

$\hat{\sigma} = 4$

$\mu = ?$

$NC = 90\% \Rightarrow$

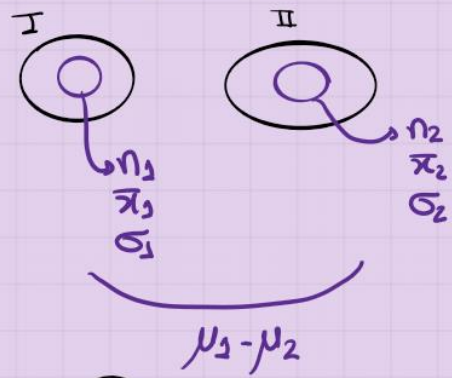


$$16 - \underbrace{\frac{(1,65)(4)}{\sqrt{300}} \cdot \sqrt{\frac{1500-300}{1500-1}}}_{E} \leq \mu \leq 16 + \frac{(1,65)(4)}{\sqrt{300}} \sqrt{\frac{1500-300}{1500-1}}$$

$$16 - 0,34 \leq \mu \leq 16 + 0,34$$

$$\boxed{15,66 \leq \mu \leq 16,34} \qquad NC = 90\%.$$

Estimación 2 poblaciones

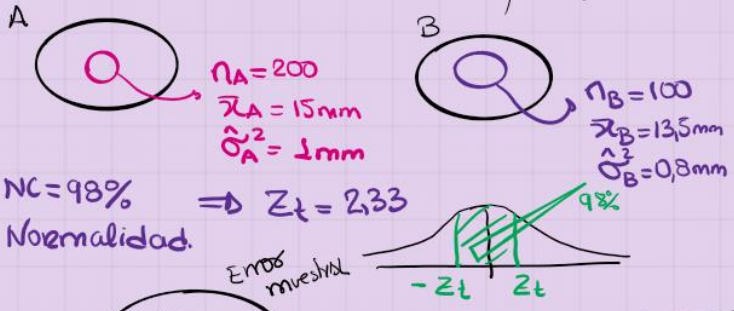


$$(\bar{x}_1 - \bar{x}_2) - Z_t \sqrt{\frac{\hat{\sigma}_1^2}{n_1} + \frac{\hat{\sigma}_2^2}{n_2}} \leq \mu_1 - \mu_2 \leq (\bar{x}_1 - \bar{x}_2) + Z_t \sqrt{\frac{\hat{\sigma}_1^2}{n_1} + \frac{\hat{\sigma}_2^2}{n_2}}$$

Error muestral

* Poblaciones Norm.
* Poblaciones Infinitas
* $n \geq 30$

Ej: Estimar la diferencia de los promedios en el diámetro de un lote de rolineras $\begin{matrix} A \\ B \end{matrix}$ $(\mu_A - \mu_B)$



NC = 98% $\Rightarrow Z_t = 2,33$

Normalidad.

Error muestral

$$(15 - 13,5) - 2,33\sqrt{\frac{1}{200} + \frac{0,8}{100}} \leq \mu_1 - \mu_2 \leq (15 - 13,5) + 2,33\sqrt{\frac{1}{200} + \frac{0,8}{100}}$$

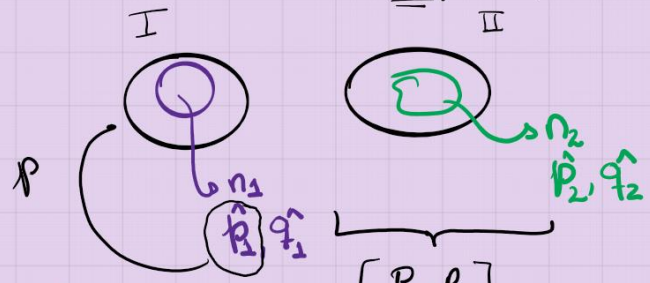
$\mu_A - \mu_B$

$$1,5 - 0,221 \leq \mu_1 - \mu_2 \leq 1,5 + 0,221$$

$$1,279 \underset{mm}{} \leq \mu_1 - \mu_2 \leq 1,721 \ mm$$

$$\mu_1 \leq 1,721 + \mu_2$$

2 Poblaciones / Proporciones

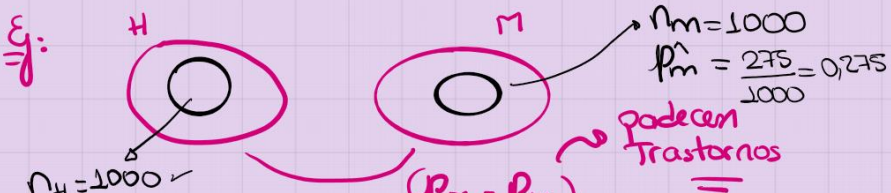


* Normalidad
* Pobl. Infinitas / $n \geq 30$

$$(\hat{p}_1 - \hat{p}_2) - Z_L \sqrt{\frac{\hat{p}_1\hat{q}_1}{n_1} + \frac{\hat{p}_2\hat{q}_2}{n_2}} \leq p_1 - p_2 \leq (\hat{p}_1 - \hat{p}_2) + Z_L \sqrt{\frac{\hat{p}_1\hat{q}_1}{n_1} + \frac{\hat{p}_2\hat{q}_2}{n_2}}$$

Error Muestral

Ej:



$\hat{p}_h = \frac{250}{1000} = 0,25 \quad \hat{q}_h = 0,75$

$p + q = 1$

NC = 95% → $Z_L = 1,96$

Error Muestral

$$(0,275 - 0,25) - 1,96 \sqrt{\frac{(0,275)(0,725)}{1000} + \frac{(0,25)(0,75)}{1000}} \leq p_M - p_H \leq (0,275 - 0,25) + *$$

$$0,025 - 0,038 \leq p_M - p_H \leq 0,025 + 0,038$$

NC 95%

$$-0,0013 \leq p_M - p_H \leq 0,063$$

0%

$$p_M \leq 0,063 + p_H$$