

APLICAÇÃO DO TEOREMA 26

$$\Pr\left(\underbrace{|\hat{\mu} - \mu| \leq \frac{1}{5}\sigma}_{E_1} \text{ e } \underbrace{|\hat{\sigma}^2 - \sigma^2| \leq \frac{1}{5}\sigma^2}_{E_2}\right) \geq \frac{1}{2}$$

$$\text{SEJA } U := \frac{n\hat{\sigma}^2}{\sigma^2} = \frac{26\hat{\sigma}^2}{\sigma^2}$$

ONDE

$$\bullet \hat{\sigma}^2 = \frac{1}{26} \sum_{i=1}^{26} (X_i - \bar{X}_{26})^2$$

$$\bullet \bar{X}_{26} = \frac{1}{26} \sum_{i=1}^{26} X_i$$

$$\Pr(E_1 \text{ e } E_2) \geq \frac{1}{2}$$

$$\underbrace{\Pr(E_1)}_{P_1} \underbrace{\Pr(E_2)}_{P_2} \geq \frac{1}{2}$$

$$P_1(n) = P_r \left(|\hat{\mu} - \mu| < \frac{1}{5} \sigma \right)$$

$$= P_r \left(\frac{|\hat{\mu} - \mu|}{\sigma} < \frac{1}{5} \right)$$

$$= P_r \left(\frac{\sqrt{n} |\hat{\mu} - \mu|}{\sigma} < \sqrt{n} \frac{1}{5} \right)$$

$$U = \frac{n (\hat{\mu} - \mu)^2}{\sigma^2}$$

$$\bullet P_2(n) = P_r \left(U < \frac{n}{25} \right)$$

$$U \sim \chi^2_{1-2\alpha}(2)$$

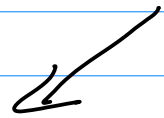
$$P_2(n) = P_r\left(\left|\hat{\sigma}^2 - \sigma^2\right| \leq \frac{1}{5}\sigma^2\right)$$

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

$$\hat{\sigma} = \sqrt{\hat{\sigma}^2}$$

$$\hat{\sigma} = \sqrt{\frac{\sum_{i=1}^n (x_i - \bar{x}_n)^2}{n}}$$

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



$$P_2(n) = P_r\left(\frac{|\hat{\sigma}^2 - \sigma^2|}{\sigma^2} < \frac{1}{5}\right)$$

$$= P_r\left(-\frac{1}{5} < \frac{\hat{\sigma}^2 - \sigma^2}{\sigma^2} < \frac{1}{5}\right)$$

$$= P_r\left(0.8 < \frac{\hat{\sigma}^2}{\sigma^2} < 1.2\right)$$

$$= P_r\left(n \cdot 0.8 < \frac{n \hat{\sigma}^2}{\sigma^2} < 1.2 n\right)$$

$$= P_r\left(0.64n < \boxed{\frac{n \hat{\sigma}^2}{\sigma^2}} < 1.44n\right)$$

$$V = \frac{n \hat{\sigma}^2}{\sigma^2}$$

$\sim \text{QVI-QVADO}$
(n-2)

$$\bullet f_2(n) = \Pr(0.64n < V < 1.44n)$$

$$\underline{f_1(n)} \quad \underline{f_2(n)} \geq \frac{1}{2}$$

$$\Pr\left(V < \frac{1.44n}{5}\right) \left\{ \Pr(V < 1.44n) - \Pr(V < 0.64n) \right\} \geq \frac{1}{2}$$