

Exercice 5.15.

- X : diamètre de câbles (en cm)
- $\mu = 0.9$ cm et $\sigma = 0.06$ cm
- Échantillon : $n = 36$ câbles

a) Par le TCL, car $n = 36 \geq 30 \Rightarrow \bar{X} \sim \mathcal{N}(\mu; \sigma_{\bar{X}}^2)$

b) $\sigma_{\bar{X}}^2 = \frac{\sigma^2}{n} = \frac{0.06^2}{36} = 0.0001 \Rightarrow \bar{X} \sim \mathcal{N}(0.9; 0.0001)$

Remarque : $\sigma_{\bar{X}} = \sqrt{0.0001} = 0.01$

c) • $z_{0.88} = \frac{0.88 - 0.9}{0.01} = -2$; $z_{0.92} = \frac{0.92 - 0.9}{0.01} = 2$

$$\begin{aligned} \bullet P(|\bar{X} - 0.9| > 0.02) &= P(\bar{X} < 0.88) + P(\bar{X} > 0.92) = \\ &= P(Z < -2) + P(Z > 2) = P(|Z| > 2) = 2[1 - P(Z < 2)] = \\ &= 2[1 - \Phi(2)] \cong 2 \cdot 0.0228 \cong 4.56\% \end{aligned}$$
