

Parâmetros

• Balan mais provável

$$\bar{d}_p = \frac{19,00 + 19,05 + 18,95 + 18,90 + 18,90}{5} = 18,96 \text{ mm}$$

$$\bar{h}_p = \frac{15,40 + 15,45 + 15,50 + 15,45 + 15,45}{5} = 15,45 \text{ mm}$$

• Erro tipo A

$$\sigma_{ADp} = \sqrt{\frac{\sum (d_i - \bar{d})^2}{n-1}} = \sqrt{\frac{(19,00 - 18,96)^2 + (19,05 - 18,96)^2 + (18,95 - 18,96)^2 + (18,90 - 18,96)^2 + (18,90 - 18,96)^2}{5-1}}$$

$$\sigma_{ADp} = \sqrt{\frac{1,6 \cdot 10^{-3} + 8,1 \cdot 10^{-3} + 1 \cdot 10^{-4} + 3,6 \cdot 10^{-3} + 3,6 \cdot 10^{-3}}{4}} = \sqrt{\frac{0,017}{4}} = \sqrt{4,25 \cdot 10^{-3}}$$

$$\sigma_{ADp} = 0,065192024$$

$$\sigma_{AHp} = \sqrt{\frac{\sum (h_i - \bar{h})^2}{n-1}} = \sqrt{\frac{(15,40 - 15,45)^2 + (15,45 - 15,45)^2 + (15,50 - 15,45)^2 + (15,45 - 15,45)^2 + (15,45 - 15,45)^2}{5-1}}$$

$$\sigma_{AHp} = \sqrt{\frac{2,5 \cdot 10^{-3} + 0 + 2,5 \cdot 10^{-3} + 0 + 0}{4}} = \sqrt{\frac{5 \cdot 10^{-3}}{4}} = \sqrt{1,25 \cdot 10^{-3}}$$

$$\sigma_{AHp} = 0,035355339$$

• Erro tipo B

$$\sigma_{Bp} = 0,05$$

• Incerteza final

$$\sigma_f = \sqrt{\sigma_A^2 + \sigma_B^2}$$

diâmetro

$$\sigma_{fd} = \sqrt{0,065192024^2 + 0,05^2}$$

$$\sigma_{fd} = 0,082558383$$

altura

$$\sigma_{fh} = \sqrt{0,035355339^2 + 0,05^2}$$

$$\sigma_{fh} = 0,061237243$$