

Exercício:

em mm

$$\bar{D}_L = \frac{19,0 + 19,5 + 19,0 + 19,5 + 19,5}{5}$$

$$\bar{D}_L = 19,3 \text{ mm}$$

$$\bar{H}_R = \frac{15,0 + 15,0 + 15,0 + 15,0 + 15,0}{5}$$

$$\bar{H}_R = 15,1 \text{ mm}$$

$$\bar{M} = \frac{11,85 + 11,85 + 11,85 + 11,85 + 11,85}{5}$$

$$\bar{M} = 11,85 \text{ g}$$

$\sigma_{Am} = ?$
 $\sigma_B = 0,01 \text{ g}$
 $\sigma_{xm} = ?$

Erro tipo A

$$\sigma_{ADR} = \sqrt{\frac{\sum (d_i - \bar{d})^2}{n-1}} = \sqrt{\frac{(19,0-19,3)^2 + (19,5-19,3)^2 + (19,0-19,3)^2 + (19,5-19,3)^2 + (19,5-19,3)^2}{5-1}}$$

$$\sigma_{ADR} = \sqrt{\frac{0,09 + 0,04 + 0,09 + 0,04 + 0,04}{4}} = \sqrt{\frac{0,3}{4}} = \sqrt{0,075}$$

$$\sigma_{ADR} = 0,273861278$$

$$\sigma_{AHR} = \sqrt{\frac{\sum (h_i - \bar{h})^2}{n-1}} = \sqrt{\frac{(15,0-15,1)^2 + (15,0-15,1)^2 + (15,0-15,1)^2 + (15,0-15,1)^2 + (15,0-15,1)^2}{5-1}}$$

$$\sigma_{AHR} = \sqrt{\frac{0,36 + 0,01 + 0,01 + 0,01 + 0,01}{4}} = \sqrt{\frac{0,4}{4}} = \sqrt{0,1}$$

$$\sigma_{AHR} = 0,223606797$$

Erro tipo B

$$\sigma_{BR} = 0,5$$

Incerteza final

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

diâmetro:

$$\sigma_{fd} = \sqrt{0,273861278^2 + 0,5^2}$$

$$\sigma_{fd} = 0,570037712$$

altura:

$$\sigma_{fh} = \sqrt{0,223606797^2 + 0,5^2}$$

$$\sigma_{fh} = 0,547722557$$