

5) Organização

$L \rightarrow 9,90 \text{ cm}$

$\delta L = 0,05 \text{ cm}$

$h \rightarrow 2,40 \text{ cm}$

$\delta h = 0,05 \text{ cm}$

$D \rightarrow 100 \text{ cm}$

$\delta D = 0$

$L_{\text{exp}} = (9,90 \pm 0,05) \text{ cm}$

$h_{\text{exp}} = (2,40 \pm 0,05) \text{ cm}$

$S = 30 \text{ cm}, 40 \text{ cm}, 50 \text{ cm}, \dots, 120 \text{ cm}$

$t_1$

$t_2$

$t_3$

$t_4$

$t_5$

$\text{sen } \theta = \frac{h}{D}$

\* Desconsiderar a incerteza do seno.

$(\text{alm}) (v \pm \delta v) = 2,0 \times 10^3 \text{ (N)}$

$\frac{v_1}{25} = 10 \Rightarrow 205 = v_1 \Rightarrow 205 + 25 = v_2 = 230$

$\frac{v_1}{25} = 20$

# Segundo o Rotativo.

## 6) Análise numérica.

$$S = 30 \text{ cm}$$

$t_1$

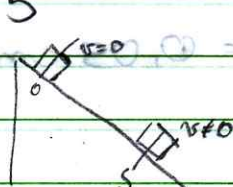
$t_2$

$t_3$

$t_4$

$t_5$

$$M_{t_{30}} = \frac{\sum_{i=1}^5 t_i}{5} \quad \text{1) } \langle t \rangle_5 = (t_1 + t_2 + t_3 + t_4 + t_5) \cdot \frac{1}{5}$$



$$2) v_s = \frac{L}{\langle t \rangle_5}$$

$$3) \delta v = v \sqrt{\left(\frac{\delta L}{L}\right)^2 + \left(\frac{\delta t}{\langle t \rangle}\right)^2}$$

$$1) \delta t = \sqrt{(\delta t_A)^2 + (\delta t_B)^2}$$

$$\delta t_A = \frac{1}{\sqrt{5}} \cdot \sigma$$

$$\sigma = \sqrt{\frac{1}{4} [(t_1 - \langle t \rangle)^2 + (t_2 - \langle t \rangle)^2 + \dots + (t_5 - \langle t \rangle)^2]}$$

$$= \sqrt{\frac{1}{n} \sum_{i=1}^n (t_i - \langle t \rangle)^2}$$

$$\delta t_B = 0,0001 \text{ s}$$

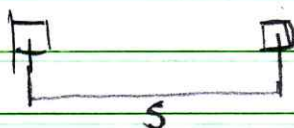
$$0,1 \text{ m.s}$$

$$0, \dots \dots \dots \uparrow$$

$$4) v_{exp,s} = (v_s \pm \delta v) \text{ (m/s)}$$

$$5) v^2 = v_0^2 + 2a S \Rightarrow v^2 = 2a S \Rightarrow a = \frac{v^2}{2S}$$

$$a_s = \frac{v_s^2}{2S}$$





6) fórmula corrigida

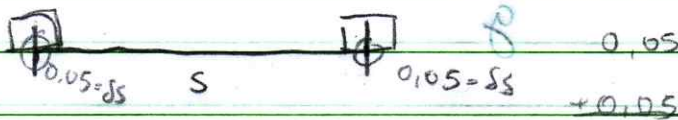
$$\frac{v}{c} = \sin \theta \quad , \quad \frac{\cos \theta}{\sin \theta} = p \quad (e)$$

$$\delta a_s = a_s \sqrt{\left(\frac{2\delta v}{v_s}\right)^2 + \left(\frac{\delta S}{S}\right)^2}$$

$$\frac{\cos \theta}{\sin \theta} = p$$

$$\delta v_s \approx \sqrt{\left(\frac{\delta L}{L}\right)^2 + \left(\frac{\delta t}{t}\right)^2} \quad \text{selecione } (p \pm p) = \text{prop } (ok)$$

$$\delta S = 1 \text{ mm} = 0,1 \text{ cm}$$



$$\sin \theta = p \quad 0,105$$

→ no dados da amostra

$$7) \{a_s\} = \{a_{30}, a_{40}, a_{50}, \dots, a_{120}\}$$

$$\langle a \rangle = \frac{1}{10} (a_{30} + a_{40} + a_{50} + \dots + a_{120})$$

10 → número de dados

$$\sigma_a = \frac{1}{\sqrt{10}} \cdot \sqrt{\frac{1}{9} [(a_{30} - \langle a \rangle)^2 + (a_{40} - \langle a \rangle)^2 + \dots + (a_{120} - \langle a \rangle)^2]}$$

$$8) a_{\text{exp}} = (\langle a \rangle \pm \sigma_a) \text{ (m/s}^2\text{)}$$

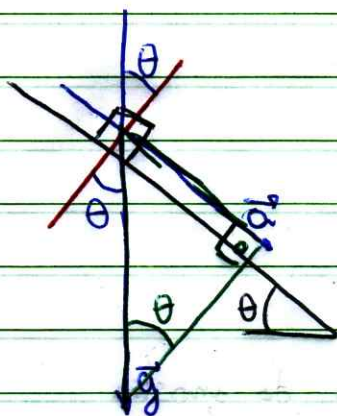


$$a = g \cdot \sin \theta \Rightarrow g = \frac{a}{\sin \theta}$$

$$9) \quad g = \frac{a}{\sin \theta}, \quad \sin \theta = \frac{h}{D}$$

$$\delta g = \frac{\delta a}{\sin \theta}$$

$$10) \quad g_{exp} = (g \pm \delta g) \text{ (m/s}^2\text{)}$$



$$\sin \theta = \frac{a}{g}$$

$$a = g \cdot \sin \theta$$