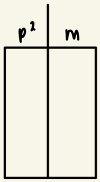
LAB NOTES

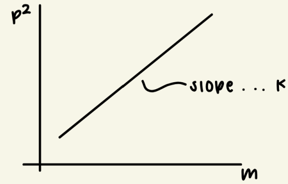
LAB REPORT NOTES

→ Data : exact measurements, tables



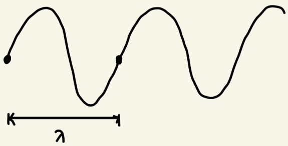
VS.

Analysis : graphs



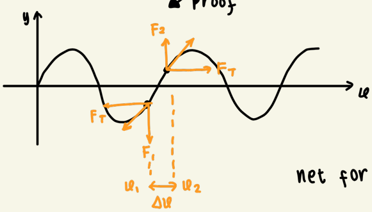
→ **LAB II**

- wave length is 1λ (from peak-peak)



- $c = \frac{\lambda}{T}$ or $c = \lambda f$
- \# of harmonics doesn't matter since it's still the same string frequency
- $\mu = \frac{M_{string}}{L_{string}}$ $\quad C = \sqrt{\frac{F_T}{\mu}} \Rightarrow C^2 = \frac{F_T}{\mu}$

proof



net force (x-dir) = 0

$$\frac{F_1}{F_T} = -\frac{\partial y}{\partial \ell}\bigg|_{\ell_1} \qquad \frac{F_2}{F_T} = \frac{\partial y}{\partial \ell}\bigg|_{\ell_2}$$

ΣF_y (string is just going up & down)

$$F_{net} = F_1 + F_2$$

$$= F_T\left[\frac{\partial y}{\partial \ell}\bigg|_{\ell_2} - \frac{\partial y}{\partial \ell}\bigg|_{\ell_1}\right] = ma$$

density

$$\mu = \frac{M_{string}}{L_{string}}$$

$$m = \mu \Delta\ell$$

$$a = \frac{F_T}{\mu}\underbrace{\frac{\left[\frac{\partial y}{\partial \ell}\Big|_{\ell_2} - \frac{\partial y}{\partial \ell}\Big|_{\ell_1}\right]}{\Delta\ell}}_{\text{definition of derivative}}$$

$$\frac{\partial^2 y}{\partial t^2} = \frac{F_T}{\mu} \frac{\partial^2 y}{\partial x^2}$$

<from class> $$\frac{\partial^2 y}{\partial t^2} = c^2 \frac{\partial^2 y}{\partial x^2}$$

$$c^2 = \frac{F_T}{\mu} \Rightarrow c = \sqrt{\frac{F_T}{\mu}}$$

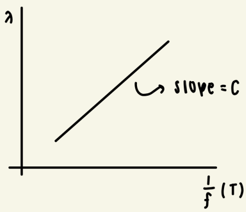
$$c^2 = \frac{1}{\mu} F_T$$

→ LAB III

- sound wave
  - → microphone + meter stick
  - → pasco interface
  - → pipe / tubes
  - → vibration generator
- PART 1 - measuring speed of sound (343 m/s)

  $c = \lambda f$ *change sample rate to 2 kHz

  ∴ frequency lower, when tube is lengthened
- PART 2
  - → do at least 5 lengths



$$c = \lambda f$$
$$\lambda = \frac{c}{f}$$
$$\lambda = \boxed{C} \frac{1}{f}$$
$$y = \boxed{m} x$$

m (slope) = C