LAB #3: Vibrating Strings

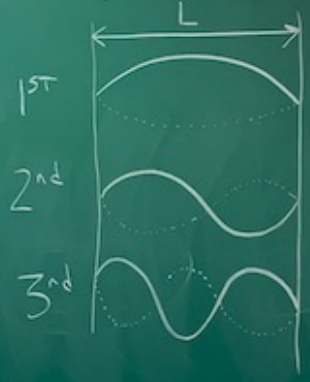
- Show equation, calcs, rounding, etc fully
- watch units (see Theory →)

eg. $T = mg$

T: N $\left(\frac{kg\,m}{s^2}\right)$, m: kg, g: m/s^2

Harmonics

λ changes!



$\lambda_1 = 2L$

$\lambda_2 = L$

$\lambda_3 = \frac{2L}{3}$

Theory

Frequency $f_1 = \frac{1}{2L}\sqrt{\frac{T}{\mu}}$

Harmonics $f_n = n f_1$

Wave Speed $V = f_n \lambda_n$

Compare f's $\%\text{diff} = \frac{hi - lo}{avg} \times 100$

f, frequency (Hz)

L, vibrating length (m)

T, tension (N)

μ, mass-per-unit-length $\left(kg/m\right)$

$\mu_{thin} = 1.43 \times 10^{-4}$ kg/m

$\mu_{thick} = 5.72 \times 10^{-4}$ kg/m

V, velocity (m/s)

λ, wavelength (m)