Waves on Strings

As you work through the steps in the lab procedure, record your experimental values and the results on this worksheet. Use the exact values you record for your data to make later calculations.

Given information:

1 m = 3.28 ft

linear mass density of the string $\rho = 1.35 \times 10^{-4}$ kg/m.

Part A: Traveling wave on a Slinky - Data

Record the mass of the Slinky which is given on the attached label.

Part A.1

For case 1, record the length of the stretched Slinky.

Record the time it takes for the pulse to reach the opposite end in three good runs.

Table 1

Trial	Tension (N)	Tension (s)
1		
2		
3		

Record the tension in the stretched Slinky.

Record the mean value of the time and its uncertainty for this case. The uncertainty in time is the standard error.

Part A.2

For case 2, record the length of the stretched Slinky.

Record the time it takes for the pulse to reach the opposite end in three good runs.

Table 2

Trial	Tension (N)	Tension (s)
1		
2		
3		

Record the tension in the stretched Slinky.

Record the mean value of the time and its uncertainty for this case. The uncertainty in time is the standard error.

Part B: Standing waves on a string - Data

Give the length between the end supports of the string.

Part B.1: Constant Tension

Enter the mass of the weight holder and weights combined.

For each number of antinodes, record the frequency.

Table 3

Number of antinodes, n	**Frequency, f (Hz)**
1	
2	
3	
4	
5	
6	

Give the slope of the frequency (f_1) vs. number of antinodes and its uncertainty.

Part B.2: Constant Wavelength

Measure the length between the end supports of the string, in case it got changed.

Table 4

Mass, kg	**Frequency, f_2 (Hz)**

Give the experimental slope of the f vs. $(T_s)^{1/2}$ graph and its uncertainty.

Upload the file with your graphs. Do a print screen and save the graphs as a file with a maximum size of 1 MB. (*You will upload this file in the WebAssign question.*) Print the graph for your TA to sign, and for your reference.