PENDULUM AND PROJECTILE MOTION

SPH3U Unit 1 Lab

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LaTeX document code

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1 Pendulum Motion

The purpose of the pendulum motion lab is to determine the acceleration due to gravity. A pendulum with a string length of 0.33m, attached with a 1.5cm in diameter steel ball, is dropped from a 5° from the right without external forces. We recorded the time it takes for 10 oscillations for a total of 3 times for maximum accuracy.

1.1 Raw data

Length of pendulum wire: $L = 33\text{cm} = 0.33\text{m}$

This marginal time difference can be caused by errors like:

- Imprecise measurements: EXPLAIN
- Gross errors: EXPLAIN

2 Projectile motion

The purpose of the projectile motion lab is to determine the properties of a projectile through displacement graphs, velocity graphs, and a variety of data. We placed a steel ball at the top of the ramp, and captured the trajectory of the steel ball using a slow motion camera.

2.1 Raw data

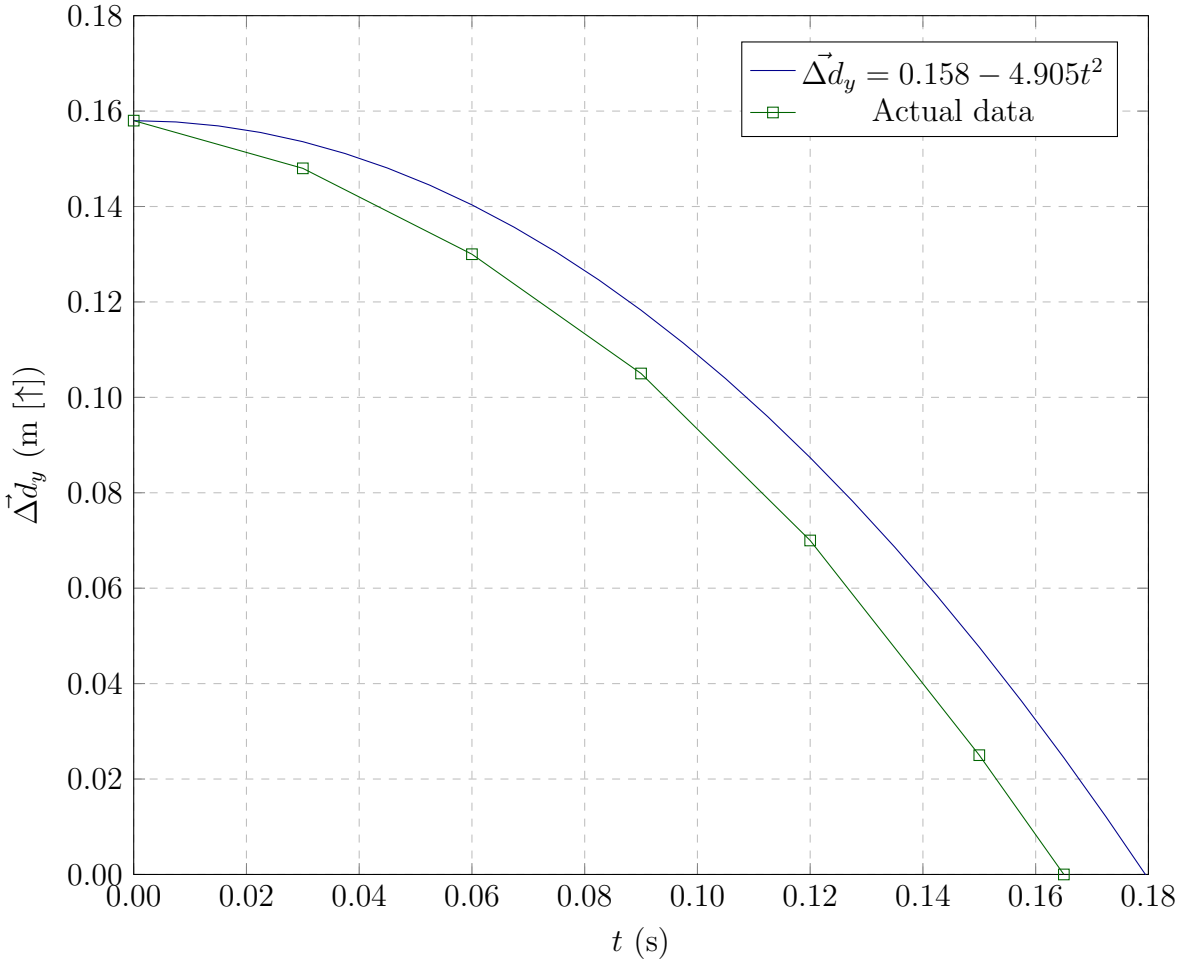
After reviewing the slow motion video, we can compile the following data points:

$\Delta\vec{d}_x$ (m [$\rightarrow$])	$\Delta\vec{d}_y$ (m [$\uparrow$])	t (s)
0.000m	0.158m	0.000s
0.015m	0.146m	0.030s
0.030m	0.128m	0.060s
0.045m	0.105m	0.090s
0.060m	0.068m	0.120s
0.075m	0.023m	0.150s
0.083m	0.000m	0.165s

Note: We measured everything using the steel ball's center.

$$\begin{aligned}\vec{\Delta}d_x &= \vec{\Delta}d_{xf} - \vec{\Delta}d_{xi} \\ &= 0.083\text{m } [\rightarrow] - 0.0\text{m } [\rightarrow] \\ \vec{\Delta}d_x &= 0.083\text{m } [\rightarrow]\end{aligned}$$

Position-Time graph of the projectile motion



3 Licensing

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