

Taylor Rhodes, Kevin Lubin, and Ryan Oliveira

PSCI 111—Physics I Lab

TA Harlan Heilman

8 March 2022

## Lab 8 Data and Observations

### Pre-Lab Notes

- Normal force is always horizontal to 'something' ie. The surface
- Include displacement vector in force-diagram
  - o Not generally included in force-diagrams
- Considerations in Work
  - o Vector-dot products: 'How much are the two vectors pointing in either direction'
  - o Force and displacement in terms of a right triangle to utilize trig
- \*Which direction the force and displacement are going to ensure nice angles to work with
- \*Ramp angle must be 4-5 degrees
- Spring scale: built into capstone

### *Work done on a cart moving at constant velocity*

Mass of the cart: 253.1g

Mass of black steel bar: 499.5 g

Hypotenuse of angle: 120.6 cm

Rise Angle: 10.3

$$\theta = \arcsin\left(\frac{\text{rise}}{\text{hyp}}\right) = \arcsin\left(\frac{10.3}{120.6}\right) = 4.88 \text{ degrees}$$

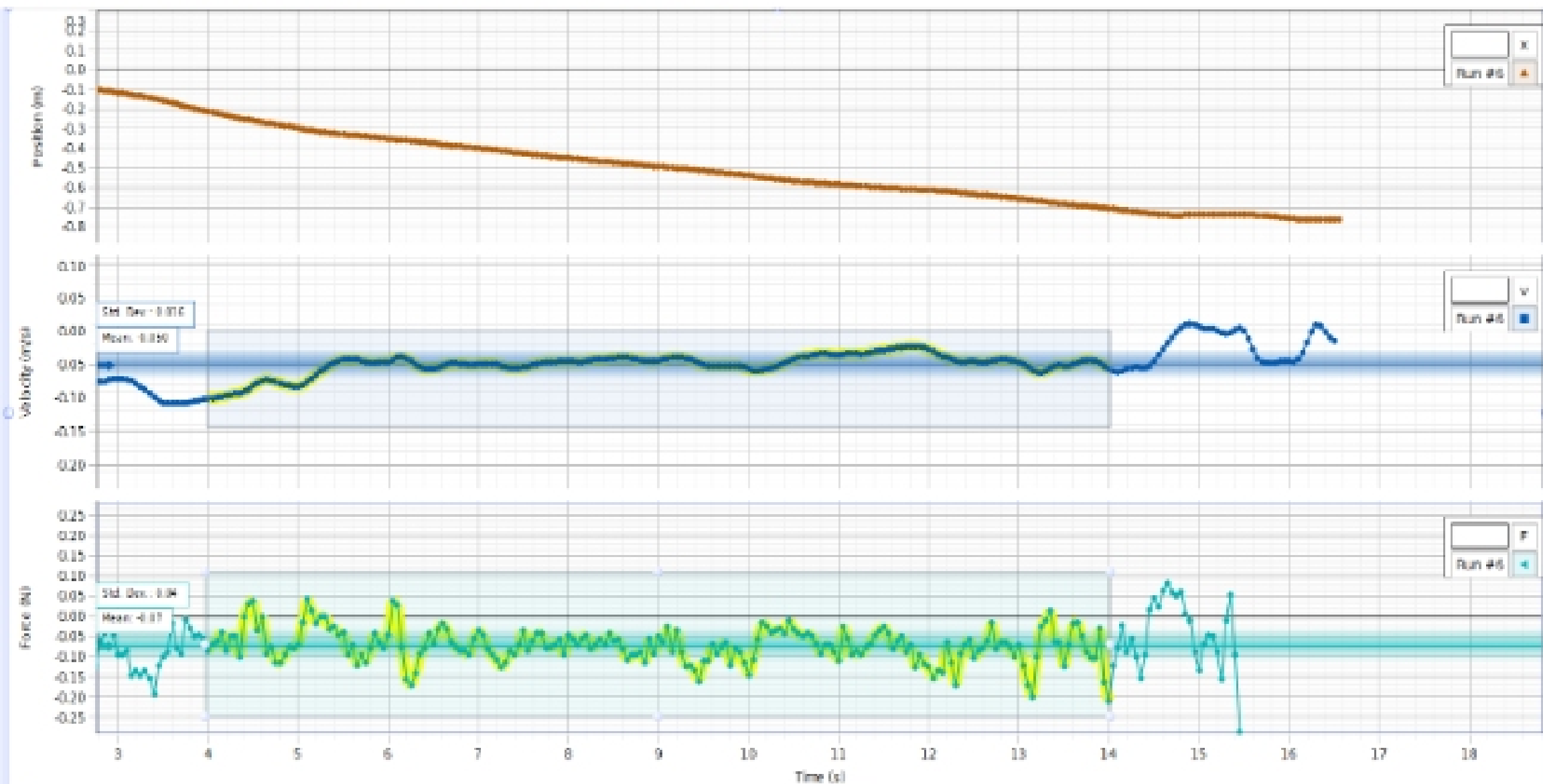
Dependent Variable: Mass of the cart, mass of the steel, and length of the string

Independent Variable: Angle of the track, angle of the string, displacement, and force applied to the string.

## Work Done on a Cart Moving Up the Ramp at Constant Velocity Graph



## Work Done on a Cart Moving Down the Ramp at Constant Velocity Graph



$$\Delta d = 0.5 \text{ meters and Force} = -0.07$$

$$\text{Work} = F \times d \cos\theta \rightarrow (-0.07)(0.5)(0.996) = -0.035 \text{ J}$$