Determining the relationship between hanging masses and the angle of a frictionless plane

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1 Introduction

1.1 Research Question

When the mass of an object on a frictionless plane is altered, and the mass of a hanging object adjusted so equilibrium is achieved, Can this be used to find the angle of the plane?

1.2 Rationale

1.2.1 Hypothesis

1.3 Methodology

1.3.1 Modifications

1.3.2 Materials

- Angle gun
- Frictionless plane
- Brass weights
- Blue tack
- Scale
- Carriage

1.3.3 Method

1. Set up slope at a constant angle. It will remain at this angle for the entire duration of the experiment.
2. Set the hanging mass for the respective set of trials (m_1).
3. Alter the cart mass (m_2) until equilibrium with m_1 is achieved.
4. Measure m_1 and m_2
5. Repeat for set number of trials and m_1 values.

1.3.4 Risk Assessment

2 Results and Evaluation

2.1 Results

Data was plotted in excel, with c on the x-axis, and h on the y-axis. A trendline was formed from the graph.
In theory, the data should have represented the equation:

$$c = h\frac{1}{\sin(\theta)}$$

which was rearranged to give

$$\frac{h}{c} = \sin(\theta)$$

$$\frac{c}{h} = \text{gradient}$$

$$\therefore \frac{h}{c} = \frac{1}{\text{gradient}}$$

$$\therefore \sin(\theta) = \frac{1}{\text{gradient}}$$

$$\therefore \sin^{-1}\left(\frac{1}{\text{gradient}}\right) = \theta$$

2.2 Discussion

3 Conclusion