Physics 8.01T   Fall Term 2004

Experiment 05A: Static Equilibrium

Section and Group: _____

Participants: _____

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Each group need turn in only one report.

When you fit an expression of the form $T = A/\sin\theta$ to your data:

1. What value did your fit give for A, and how does it compare to $Mg/2$?

2. What did your fit give for the Root MSE? (Remember to divide by $\sqrt{\text{no. of points}}$ to correct for the bug in *DataStudio*.)

3. Suppose that the RMS error were $\pm 0.15\,\text{N}$ and the coefficient A were $0.5\,\text{N}$. Assume that the RMS error comes from errors in the measurement of the vertical distance from the point the weight attaches to the string and the horizontal line between the string support points, which you may take to be $40\,\text{mm}$ apart.

   Estimate how much the measurement error would be when $\sin\theta = 0.1$ and when $\sin\theta = 0.5$. Give your answer in mm. (You should use the approximation $\sin\theta \simeq \tan\theta \simeq \theta$ in doing this calculation.)

4. Does the estimate above indicate that it is the likely source of the error?