Determining the Effect of Ramp Incline on Acceleration

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1 Introduction

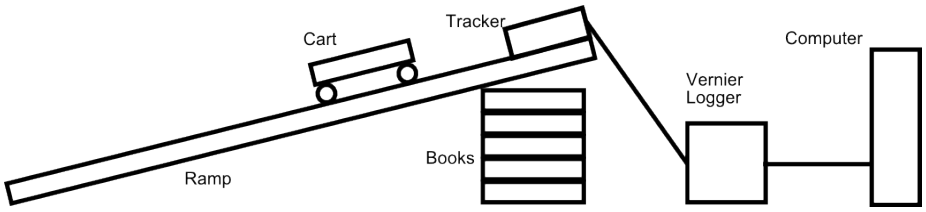
2 Materials

1. 1 Cart
2. 1 Ramp
3. 1 Ruler
4. 1 Vernier Logger
5. 1 Position Tracker
6. 1 Computer
7. 5 Books

3 Procedure

1. Set up Vernier box with position logger
2. Place one book on a flat surface
3. Indicate a constant distance on the ramp
4. Lay one end of the ramp on the book
5. Place position logger on the elevated end of the ramp
6. Place cart at beginning of indicated distance
7. Let go of cart, track acceleration of cart
8. Record average acceleration for the cart
9. Repeat steps 2-7, iterating the book count ($1 \rightarrow 5$)

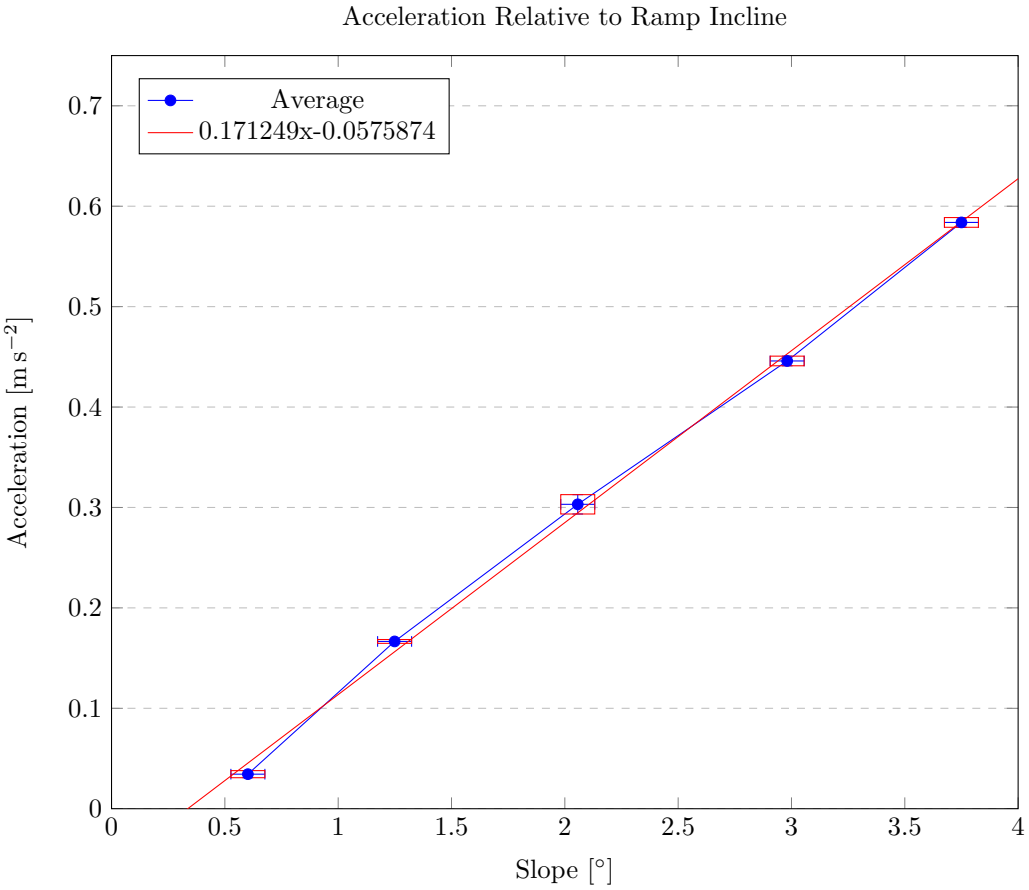
4 Diagram



5 Data

Height	Slope	Trial 1	Trial 2	Trial 3	Trial 4	Trial 5	Average
1.5 cm	0.6016°	$0.031\,72\,\mathrm{m\,s^{-2}}$	$0.032\,57\,\mathrm{m\,s^{-2}}$	$0.033\,46\,\mathrm{m\,s^{-2}}$	$0.037\,95\,\mathrm{m\,s^{-2}}$	$0.036\,37\,\mathrm{m\,s^{-2}}$	$0.034\,414\,\mathrm{m\,s^{-2}}$
3.1 cm	1.249°	$0.1659\,\mathrm{m\,s^{-2}}$	$0.1670\,\mathrm{m\,s^{-2}}$	$0.1683\,\mathrm{m\,s^{-2}}$	$0.1647\,\mathrm{m\,s^{-2}}$	$0.1671\,\mathrm{m\,s^{-2}}$	$0.1666\,\mathrm{m\,s^{-2}}$
5.1 cm	2.057°	$0.3036\,\mathrm{m\,s^{-2}}$	$0.3099\,\mathrm{m\,s^{-2}}$	$0.3007\,\mathrm{m\,s^{-2}}$	$0.3080\,\mathrm{m\,s^{-2}}$	$0.2935\,\mathrm{m\,s^{-2}}$	$0.303\,14\,\mathrm{m\,s^{-2}}$
7.4 cm	2.981°	$0.4492\,\mathrm{m\,s^{-2}}$	$0.4431\,\mathrm{m\,s^{-2}}$	$0.4485\,\mathrm{m\,s^{-2}}$	$0.4476\,\mathrm{m\,s^{-2}}$	$0.4411\,\mathrm{m\,s^{-2}}$	$0.4459\,\mathrm{m\,s^{-2}}$
9.3 cm	3.750°	$0.5887\,\mathrm{m\,s^{-2}}$	$0.5813\,\mathrm{m\,s^{-2}}$	$0.5839\,\mathrm{m\,s^{-2}}$	$0.5808\,\mathrm{m\,s^{-2}}$	$0.5846\,\mathrm{m\,s^{-2}}$	$0.583\,86\,\mathrm{m\,s^{-2}}$
Uncertainty							
0.05 cm	0.075°	$0.003\,536\,\mathrm{m\,s^{-2}}$	$0.0019\,\mathrm{m\,s^{-2}}$	$0.009\,64\,\mathrm{m\,s^{-2}}$	$0.0048\,\mathrm{m\,s^{-2}}$	$0.004\,84\,\mathrm{m\,s^{-2}}$	

Start Point	End Point	Length of Track	Uncertainty
50 cm	192.2 cm	142.2 cm	0.1 cm


Acceleration Relative to Ramp Incline
Average
0.171249x-0.0575874
Acceleration [m s^{-2}]
Slope [°]
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0
0.5
1
1.5
2
2.5
3
3.5
4