Petroleum University of Technology

In the name of GOD

Pendulum and System of mass and spring

Report from a laboratory experiment conducted on?? 2-May-17

As part of vibration lab

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Abstract:

Simple pendulum is an ideal device includes a mass point where a thread is inelastic and no mass hanging, if the pendulum from one side to balance the size of the angle θ and then left, under the influence of the restoring force is moved on an arc around a point of equilibrium, to do reciprocating motion.

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1. Introduction and Background

Many things in nature are periodic: the seasons of the year, the phases of the moon, the vibration of a violin string, and the beating of the human heart. In each of these cases, the events occur in repeated cycles, or periods. In this project you will investigate the periodic motion of a spring. Basic physics will then allow you to determine the Hooke's Law spring constant. Your analysis will also yield the effective mass of the spring, a factor that is important in real-world Engineering applications.

2. Theory

The pendulum of equilibrium deflected 10 degrees. Then released and measure the time of 10 swings. Then we changed the length of the pendulum and repeat this action for three different lengths.
The mass-spring system of equilibrium deflected 1 cm. then released and measure the time of 10 reciprocating. Then we changed the mass and repeat this actin for three different masses.

3. List of Equipment Used

Pendulum, inelastic thread, mass, stopwatch, spring.

4. Procedure

We deflect the pendulum with mass of 88.4 g and length of 38 cm 10 degree and release it and the time of 10 swing measured t=12.13 s. we repeat this for length of 31 cm and 56.6 cm and mass of 181 g.
The mass of 1470 g is attached to the spring and displace it 1 cm and the time of 10 oscillations Is measured 3.28 s. we repeat this for mass of 1670 g and 1970 g.

5. Data

Pendulum:
Mass1=91 g

Length1=38 cm	10 swing	time=12.28 s	T=1.228	g= 9.95
Length2=31 cm	10 swing	time=10.97 s	T=1.097	g= 10.17
Length3=57 cm	10 swing	time=15.30 s	T=1.530	g= 9.61

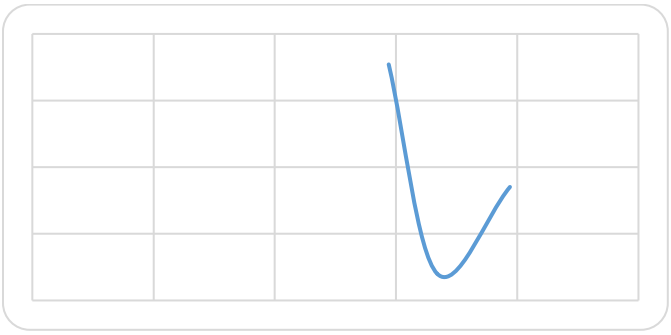
Mass2=181 g

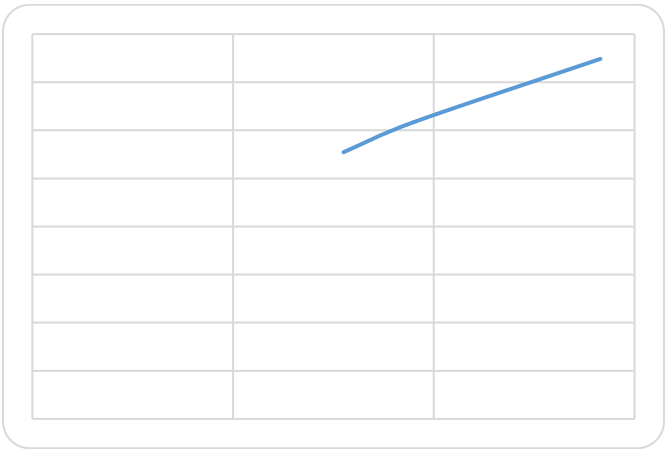
Length1=38cm	10 swing	time=12.36 s	T=1.236	g= 9.82
Length2=31 cm	10 swing	time=10.85 s	T=1.085	g= 10.40
Length3=57 cm	10 swing	time=15.12 s	T=1.512	g= 9.84

Mass-spring:
L_0=13 cm

Mass1= 1470 g	l=15 cm	10 oscillation	time=3.31 s	k= 0.004
Mass2=1670 g	l=17.3 cm	10 oscillation	time=3.63 s	k= 0.005
Mass3=1870 g	l=18 cm	10 oscillation	time=4 s	k= 0.007

T1 = 0.331 T2 = 0.363 T3 = 0.4





6. Discussion of Results

In calculating the acceleration of gravity mass does not affect.

More pendulum length results more time and more acceleration of gravity.

The present of 2 pi number in the formula in simple pendulum motion that we consider it as a small part of a circle.

More weight results more spring constant.

7. Conclusions

We can find period of pendulum and spring constant with implicit instrument.

8. References

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