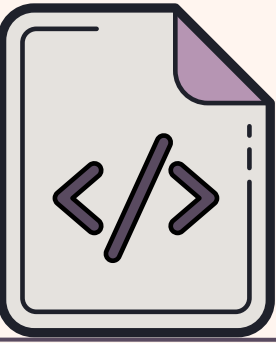


NEWTON'S SECOND LAW EXPERIMENT



Nouf Alqahtani | 2200002231@iau.edu.sa - Lama Alqarni | 2190001225@iau.edu.sa - Fatimah Alshwikhat | 2190002250@iau.edu.sa - Arwa Alabdulhadi | 2190001858@iau.edu.sa

Subject :Scientific Computing &Modeling. Supervised by : Dr. Ghada ameereh & Ms. Hind Al-ssay

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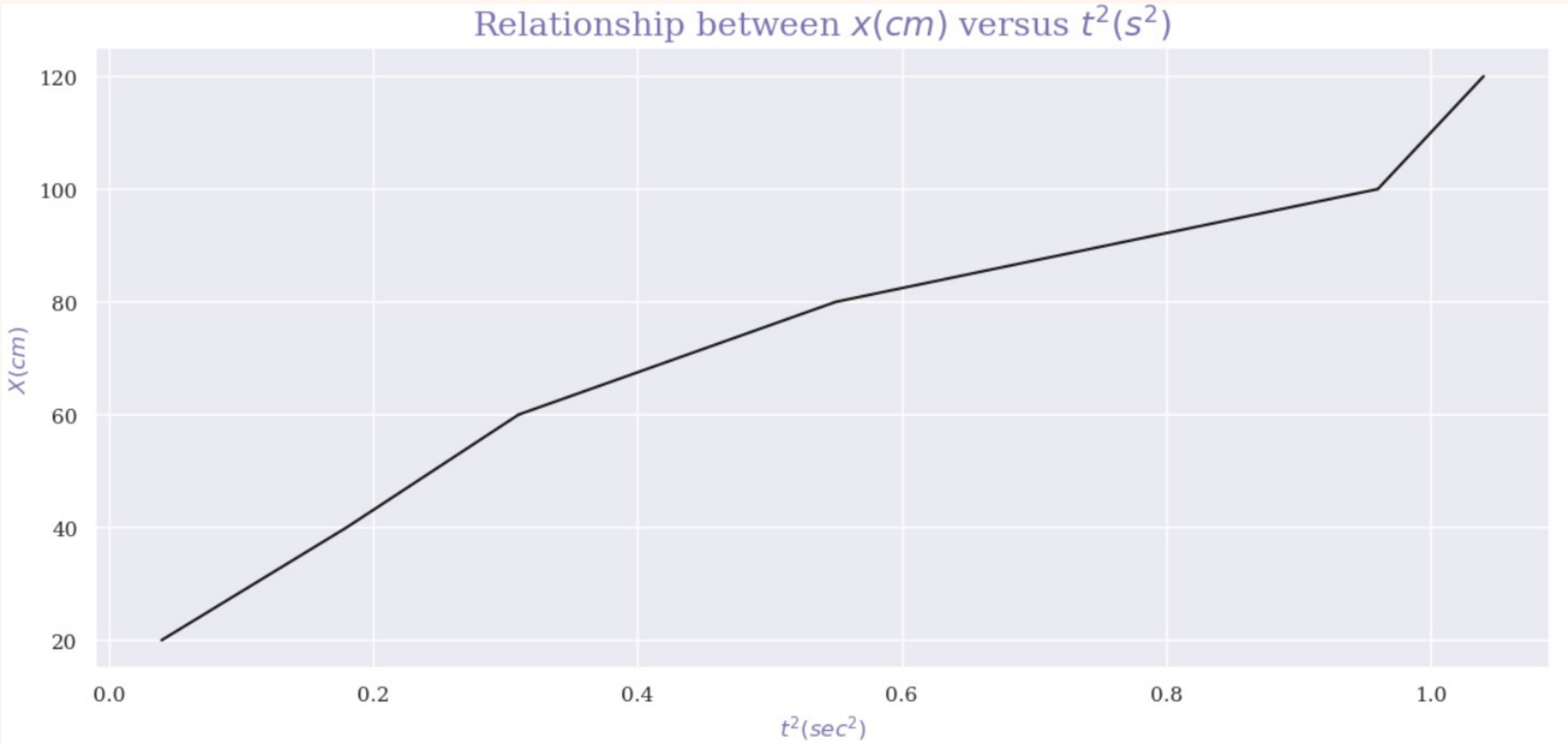
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Part 2: Graph

```
import matplotlib.pyplot as plt # Library for coding grapgh
import seaborn as sns          # Library for making the bg of graph blue squares
plt.rc('font', family='serif') # NEW CODE "SELF LEARNING"
plt.figure(figsize=(14,6)) #must be at first to exceed right      # NEW CODE "SELF LEARNING"
x=table['t^2(sec^2)']
y=table["X(cm)"]
plt.grid(True)
plt.plot(x,y,color='k')
sns.set()
plt.xlabel('$t^2(sec^2)$',fontsize=12, color='m')      # NEW CODE "SELF LEARNING"
plt.ylabel("$X(cm)$",fontsize=12 , color='m')          # NEW CODE "SELF LEARNING"
plt.title("Relationship between $x (cm)$ versus $t^2(s^2)$",fontsize=18 , color='m') # NEW CODE "SELF LEARNING"

plt.show()
```

In the graph, the matplotlib.pyplot library has been imported to plot the graph, and then the Seaborn library has been imported to make the background as shown in the graph. The x-axis was defined as time squared and the y-axis as distances. New codes were used to design the graph titles, labels, fonts, and colors. [1] [3]



Graph: The relationship between the distance and the time square resulted in a linear proportional relationship.

Results & Discussion

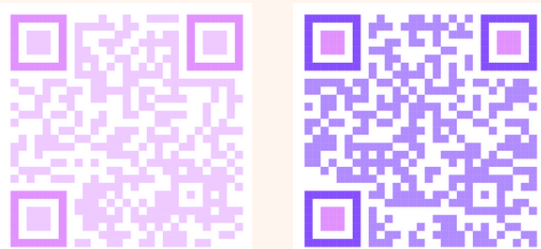
1	$\frac{gm}{M + m} a_{th} = 224.48 \text{ cm/s}^2$	Theoretical acceleration and g is the gravitational force = 980 cm/s ²
2	slop= 88.68 cm/s ²	The slop from the graph using polyfit() [4]
3	2slop a_exp = 177.37 cm/s ²	Experimental acceleration result
4	$100 \left \frac{a_{exp} - a_{th}}{a_{th}} \right $ P.E = 21.0 %	Experimental error percentage

- In tables design, we had difficulty changing the color for only heads and indexes, but we finally found the right codes.
- The slope code was hard to find because we didn't find a specific code to determine the slope of the graph itself. However, we found the polyfit and linegress, but we used polyfit so we could round the result and use index to only determine the slope.

Conclusion

In conclusion, we successfully combined physics, mathematics and programming in python language to simulate Newton's second law experiment and calculate its problems.

References & codes



Acknowledgements

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