**Graphical Analysis**

**Physics 225L**

**8:00am-10:50am**

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**Introduction**: Graphs are able to convey trends in data that the human eye cannot perceive. There are different types of graphs and the main two that are used today are Log-Log and Cartesian linear. In this lab we will be finding the slope intercept to find out if there are any relationship existing. In the log graph, we will be finding a mathematical relationship between period and planet’s semi major axis.

**Graph/Table**

1. Graph

This represents the relationship between the time and velocity.

|  |  |
| --- | --- |
| **t(s)** | **vn(m/s)** |
| 0.35 | 2.786 |
| 0.85 | 3.143 |
| 1.35 | 2.54 |
| 1.85 | 2.719 |
| 2.35 | 2.857 |
| 2.85 | 2.805 |
| 3.35 | 2.257 |
| 3.85 | 2.596 |
| 4.35 | 2.243 |
| 4.85 | 2.377 |
|  |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Noise Amp** | **Slope** | **Intercept** | **Coeffiecient of Determination** | **Acceleration** | **Vo** |
| 0.1 | -0.1728 | 3.0401 | 0.88 | 0.152 | 0.01336667 |
| 0.1 | -0.115 | 2.8778 | 0.6137 | -0.2333333 | -0.0407333 |
| 0.1 | -0.175 | 3.0907 | 0.765 | 0.16666667 | 0.03023333 |
| 0.1 | -0.1742 | 3.0267 | 0.089 | 0.16133333 | 0.0089 |
| 0.1 | -0.168 | 3.035 | 0.785 | 0.12 | 0.01166667 |
| 0.05 | -0.1474 | 2.9642 | 0.9194 | -0.0173333 | -0.0119333 |
| 0.05 | -0.1826 | 3.0693 | 0.9247 | 0.21733333 | 0.0231 |
| 0.05 | -0.1684 | 3.0499 | 0.9497 | 0.12266667 | 0.01663333 |
| 0.05 | -0.1892 | 3.123 | 0.9515 | 0.26133333 | 0.041 |
| 0.05 | -0.1512 | 3.0013 | 0.9147 | 0.008 | 0.00043333 |
| 0.08 | -0.1156 | 2.9037 | 0.6549 | -0.2293333 | -0.0321 |
| 0.08 | -0.1265 | 2.9066 | 0.7627 | -0.1566667 | -0.0311333 |
| 0.08 | -0.16 | 3.0264 | 0.8177 | 0.06666667 | 0.0088 |
| 0.08 | -0.1433 | 3.0057 | 0.8068 | -0.0446667 | 0.0019 |
| 0.08 | -0.1034 | 2.8889 | 0.6231 | -0.3106667 | -0.0370333 |
| 0.15 | -0.1531 | 3.0847 | 0.6186 | 0.02066667 | 0.02823333 |
| 0.15 | -0.1247 | 2.9083 | 0.4261 | -0.1686667 | -0.0305667 |
| 0.15 | -0.1574 | 3.0232 | 0.5335 | 0.04933333 | 0.00773333 |
| 0.15 | -0.1296 | 3.0144 | 0.5789 | -0.136 | 0.0048 |
| 0.15 | -0.1367 | 2.9894 | 0.5055 | -0.0886667 | -0.0035333 |

This table shows the data when different noise levels are introduced into a system. Here, we used different numbers and did multiple trials to find different slope, intercept, and coefficient (R^2) values. Later, using those values we found the percent variation (a and vo).

3.

This graph represents the mathematical representation between the distances each planet is from the Sun. This will help us determine how long it will take to complete one revolution around the Sun.

|  |  |
| --- | --- |
| **Semimajor** | **Period** |
| 5.79 | 0.241 |
| 10.8 | 0.615 |
| 15 | 1 |
| 22.8 | 1.88 |
| 77.8 | 11.9 |
| 143 | 29.5 |
| 287 | 84 |
| 450 | 165 |
| 590 | 248 |