

Orbital Patterns of Martian Moons

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Abstract

This project's goal was to create a top-down 2-dimensional model of the positional path of the moons of Mars, Phobos and Deimos. We created a Fortran 90 program to simulate the orbit of the two moons and generate data files for later analysis. The simulation will be provided some initial conditions of a given moon, and simulate the orbit over the course of one orbital period, as defined by NASA [2]

1 Introduction

An object in orbit is a simple kinematics problem illustrated in

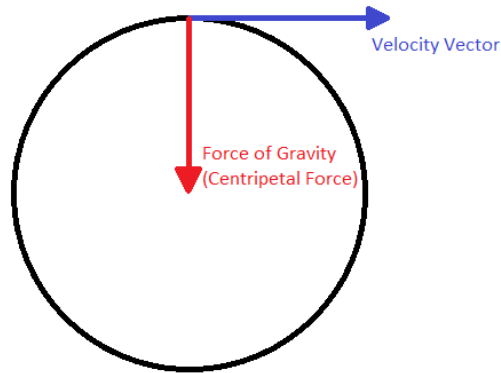


Figure 1: Orbital period in the $x - y$ plane for two full orbits of the Earth orbiting the Sun.

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2 Theory

For every equation, you need to explain each variable, for example:

$$F = \frac{mv^2}{r} . \quad (1)$$

In Eq. (1), F is the force measured in Newtons, m is the mass in kilograms, v is the velocity measured in meters per second, and r is the radius of the curved path. Equation (1) was obtained from [1].

3 Computational Methods & Techniques

Include snippets of your code, DO NOT INCLUDE YOUR ENTIRE CODE HERE!!!! Write about the methods you used, make sure you ***explain*** the methods!! Don't just say we used "RK4", you need to explain what is RK4.

4 Results

Include ALL results here, including tables of results, plots of results, numerical values, etc... Make sure you include a figure caption for EACH figure. Make sure you include a table caption for each table. For example: In Fig. 2, the orbit is set to 2 full periods...

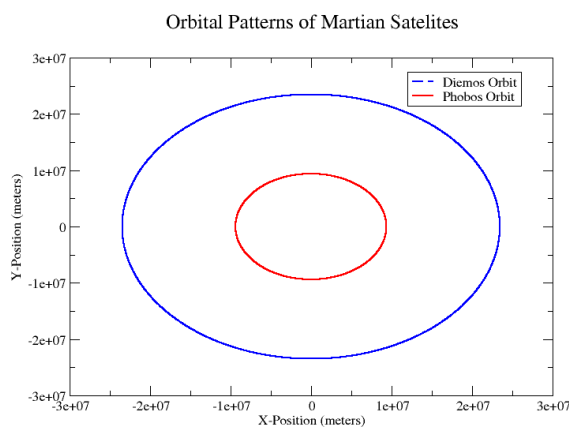


Figure 2: Orbital period in the $x - y$ plane for two full orbits of the Earth orbiting the Sun.

5 Conclusions

Summarize your results...This should be about a 1 page minimum!!!

References

- [1] Douglas C. Giancoli *Physics for Scientists and Engineers*. Pearson Education Inc., Upper Saddle River, New Jersey, 2009.

[2] NASA *Mars Fact Sheet*. NASA, 2016 nssdc.gsfc.nasa.gov/planetary/factsheet/marsfact.html