Satellite Launch

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This is an abstract Complete this summary at the end of the paper

I. INTRODUCTION

The purpose of this project is the launch of our shuttle. Interplanetary travel have huge cost and risks. Therefore we must guarantee success by planning ahead of our journey. We will develop a simulation to visualize our orbit given some parameters as a means to get a good picture of where we will end up.

II. THEORY

Refferer til forklaring av leapfrog fra tidligere deler

III. METHOD

A. Simulating trajectory

To simulate the trajectory our

Using the leapfrog method for numerical integration we can calculate the full trajectory of our shuttle.

B. Getting close enough to the target planet

To make our journey as easy as possible we first try to check where our home planet and target planet are the closest. Using the orbits calculated from Refferer til Part 2 kalkulasjoner we iterate over all positions and check at which time t_0 the distance is the smallest. With this position it seems favorable to launch from the bottom of our planet $\mathbf{r}_0$. To figure out the direction to launch our planet we begin by using an educated guess by pointing the shuttle directly at the target planet. We then continue by simulating the orbit for multiple, evenly spaced out angles from the angle of the vector pointing directly at the target planet $\mathbf{v}_0$, to a max angle of $\pi/8$ radians just to get a picture of how the launch will look for different angles. Now we have a wide span of possible angles. Before narrowing the angles down we will iterater over possible values for $|\mathbf{v}_0|$. This gives us an idea of how fast the shuttle needs to travel for it to get even close to reaching the target planet. Once this is done, we will iterate over a range of angles and velocities, find the time we are the closest to the target planet and the distance. For each case we will check if the smallest distance d satisfy the requirement for beginning orbit around target planet given by

$$d \leq l, \qquad l = |\mathbf{r}| \sqrt{\frac{M_{target}}{M_{star}}}$$

IV. RESULTS

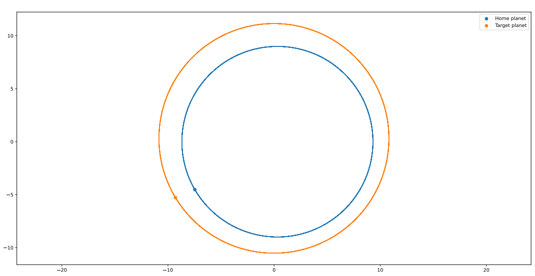

Figure 1. Position where the target planet and our home planet were the closest

V. DISCUSSION

VI. CONCLUSION

VII. APPENDIX

ACKNOWLEDGMENTS

REFERENCES