Astro 1221 Written Report #4:

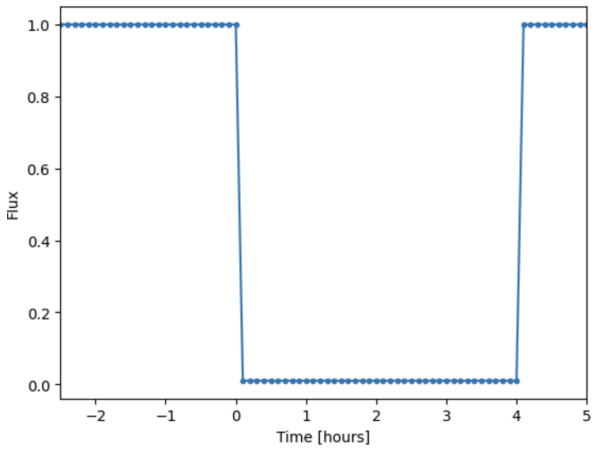
Jacob Mathew (Methods and Motivations), Owen Urban (Results and Conclusions)

Motivations:

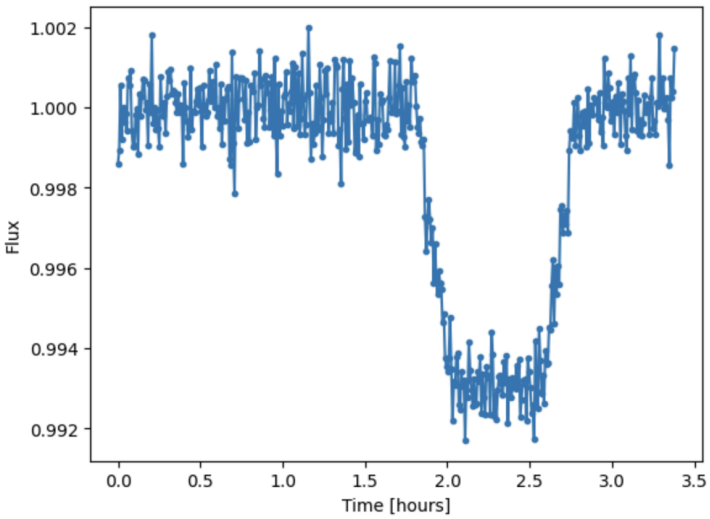
When a planet orbiting a star moves in front of the star, the light being released from the star seems to temporarily drop as the planet is blocking most of the light that's being released. This is known as a transit. By looking for transits throughout the universe, scientists on Earth are able to discover new planets outside our solar system known as exoplanets. In our project, we tried making a model for the light curves from the stars that the planets are orbiting in order to see how much light the planet is blocking and for how long.

Methods:

We visualized the models for the transits by using graphs. On the x-axis of the graphs we would plot the elapsed time in hours and then on the y-axis, we would plot the flux, which is a measure of the amount of light being released from the star during transit. We started out with a simple model using made up values to get a basic structure of how the model would be expected to look like. The time values and the flux values are stored in an array then they are plotted on a graph.



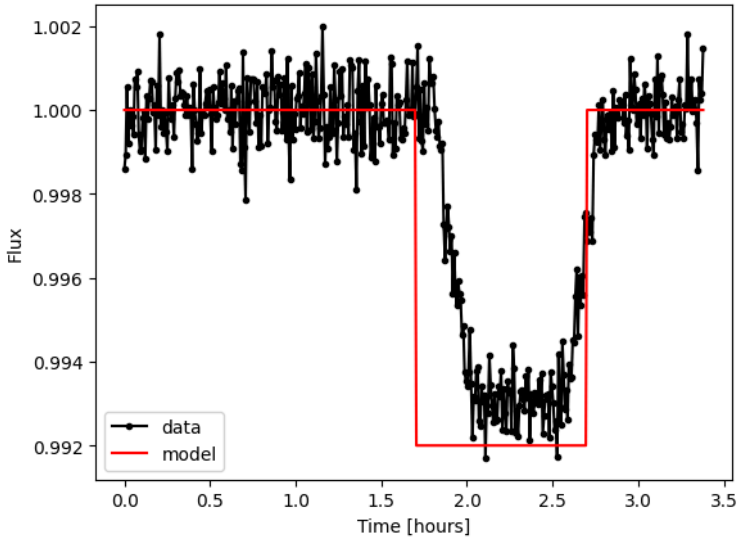
In this simple model, we can see that when the planet goes in front of the star, the amount of light that we observe being released from the star drops greatly. To really test our model we tried to take data from a real transit that happened and then compare it to our model. The data from one of the transits we looked at looked like this:



Based on different data of transits that we looked at, we were able to adjust our model accordingly so it could be a more accurate and general purpose model.

Results:

The results we gathered from our code match the base model, our graph has a clear dip in it, representing the exoplanet moving past the star. We were required to slightly adjust our model to better fit a general purpose model.



Conclusions:

The conclusion we can gather from our data is how our model very closely fits our data gathered from the changes in the light from a star. Using the constant changes in light, we can extrapolate that the changes in light are due to an exoplanet moving in front of the star. We're able to show that through the model we made, with which we can

see how closely the model our data by placing the graph for the model and the data onto the same graph. By also changing our graph, we can make a model that we can use for more data sets. In the end, our data matches the model closely, and we can change our model slightly to fit more than just our data.

Contributions:

Owen Urban: Worked on Results and Conclusions
Jacob Mathew: Worked on Methods and Motivations

AI Statement: We did not use AI for this project.