

PreCalculus BC: Project Two - October 29, 2016

Introduction

In the project, we will be investigating the parallax effect. Parallax is a displacement or difference in the apparent position of an object viewed along two different lines of sight, and is measured by the angle or semi-angle of inclination between those two lines. (src: wikipedia)

Parallax can be used to approximate the distance to objects that are far away, such as stars. Alpha Centauri, which is the nearest star to Earth has a parallax of 0.000211 degrees.

Places to start

Your first task will be to research the concept of parallax. What is it? How can it be used to find distances of far away objects? What information is needed in the calculation? In the process of this investigation, you will learn that most astronomical angle measurements use degrees, minutes of arc, and seconds of arc. A portion of your report should be dedicated to explaining how these angle measurements are used in astronomy and some historical background into why they are used. We will often talk in class about how radians provide a better way to measure angles. If that's the case, then why do astronomers continue to use degrees? There are many clues as to why this is the case in history. While I am not asking you to write a history report, I do think that addressing the historical background of the practice of astronomy will provide your report with a great deal of depth and meaning.

Second, you will need to describe the process of finding the distance to Alpha Centauri using parallax. Your report will need to present the calculation and interpret the results. You can also compare your results to the measurement found on the Alpha Centauri wikipedia page which is 4.37 light years or 1.34 pc.

Last, your report will need to address how robust this method of finding distances is. For example, can parallax be used to find the distance to objects that are not far away? Is there some minimum distance that can be used? In other words, where does this process breakdown?

Your report

As always, your report should include an abstract, procedure, and conclusion section. This report will be somewhat different in that there is not a specific mathematical problem to solve. This report will read more like a research paper whose goal is to explain the concept of parallax

to the reader. Your report will accomplish this by providing some historical background and examples related to using parallax. Your report should also investigate advantages and disadvantages to this method of measuring distances.

To help you with the abstract and conclusion, please consider the following. The abstract should be a short introduction to the problem of approximating distances we cannot directly measure such as the distance to nearby stars. The conclusion will contain a summary of the method of parallax and will highlight the advantages and disadvantages of the method.

You have two main areas of focus. The first is developing your ability to explain concepts in a clear and meaningful way. The second is to use SageMathCloud to draw illustrations.

During the next few weeks, we will talk about how to draw illustrations using SageMathCloud. Your report will need to make use of these illustrations to explain how parallax works to measure distances.