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Establishment of a new method for calculating the distance between the Sun and Earth using Python

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Abstract

We have created a new way to determine the distance between the Sun and Earth using the relationship between the Sun's position and time. We have created a new way to determine it using the relationship between the Sun's position and time.

Introduction

Eratosthenes calculated the size of the Earth's circumference with an actual accuracy of 85%. He was able to calculate the value with such accuracy without using sophisticated measuring instruments. We hypothesized and calculated a new method using the position and time relationship of the sun, with the aim of determining the distance between the sun and the earth without using sophisticated instruments.

Theory and Experiment

The time it takes for the sun to move from the side to the top of a point corresponds to the angle Θ, and the following equation holds.　T: the time it takes for the sun to move from the side of a point to the top　Θ＝(T / Time for a day)*2π　X＝r/cosθ

Results

As a result of calculating the value of T based on the reference value, it is 1.33 x 10^8 km.

Discussion

As a result, the distance between the sun and the earth was 88% accurate. Since the estimation was made in the average solar time per day, the error in the estimation will be corrected by making it in the visible solar time. Even with this in mind, since it is required with an accuracy of a little over 90%, we assume that our new method is working correctly.

Conclusion

The measurement is carried out to confirm the superiority of this method. The measurements required are the time of day when the sun comes to the side (≠ sunrise, sunset) and the south-central time. In order to find the time when the sun comes to the side, it is necessary to measure the values of atmospheric difference, viewing radius, etc.

References

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Key words

Python, Distance between the sun and Earth, Sunrise, Sunset, Eratosthenes