Astronomy 19

Tidal Report

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Overview (Part 1)

[Quantitatively understanding the statistical significance of scientific results requires us to perform a mathematical assessment of evidence from experiments. This small group project will teach us

1) How to model a scientific experiment that includes an underlying relationship with both intrinsic randomness and experimental uncertainty.

2) Determine the significance of a measurement that deviates from the intrinsic randomness expected from an experiment.

3) Program Python functions to compute mathematical models and simulate experimental noise.

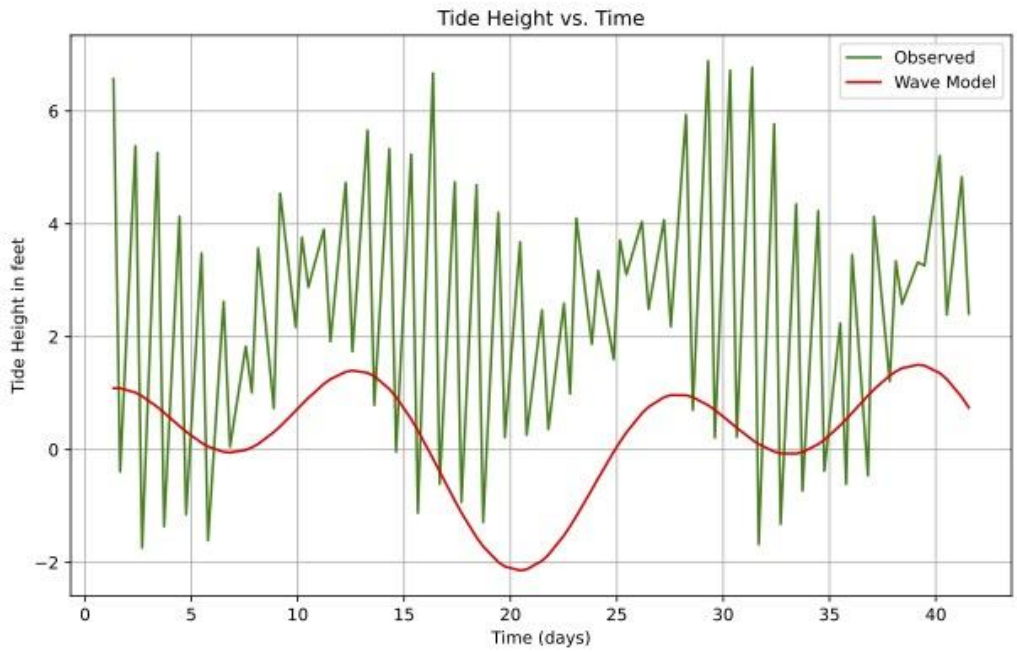
4) Plot models and data on the same graph using a Jupyter notebook, and provide a graphical representation of the statistical significance of an experimental event.

5) Develop code collaboratively using a standard development platform (GitHub).]

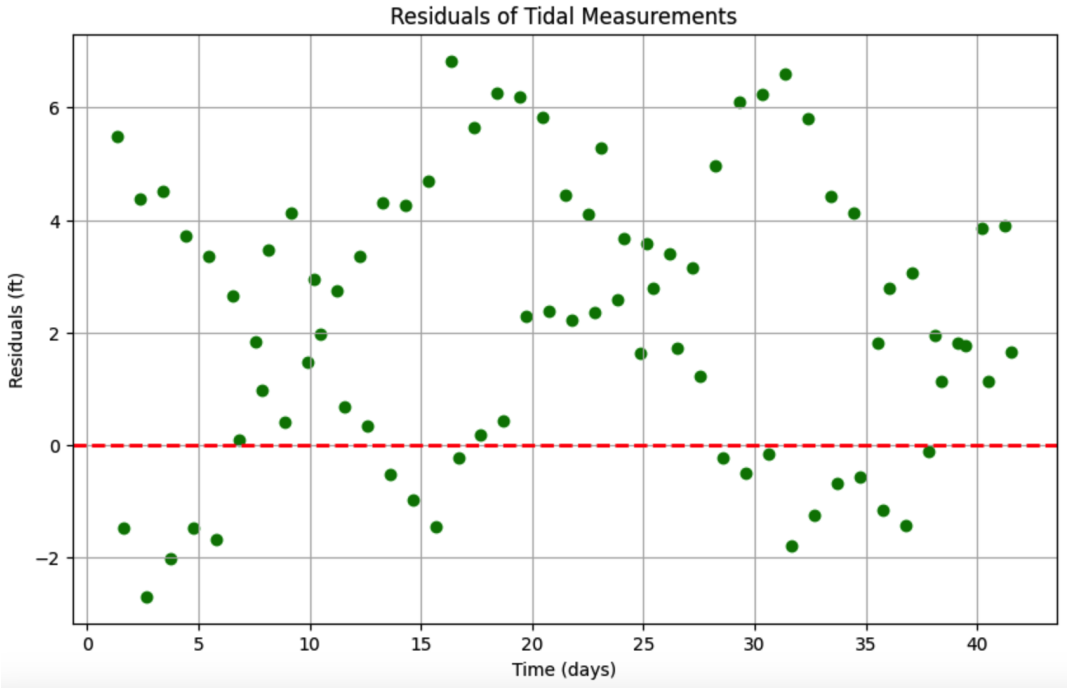
GitHub URL:	**https://github.com/AnthonyM214/GroupProject/commits/main**

Plotting the Curve (Part II)

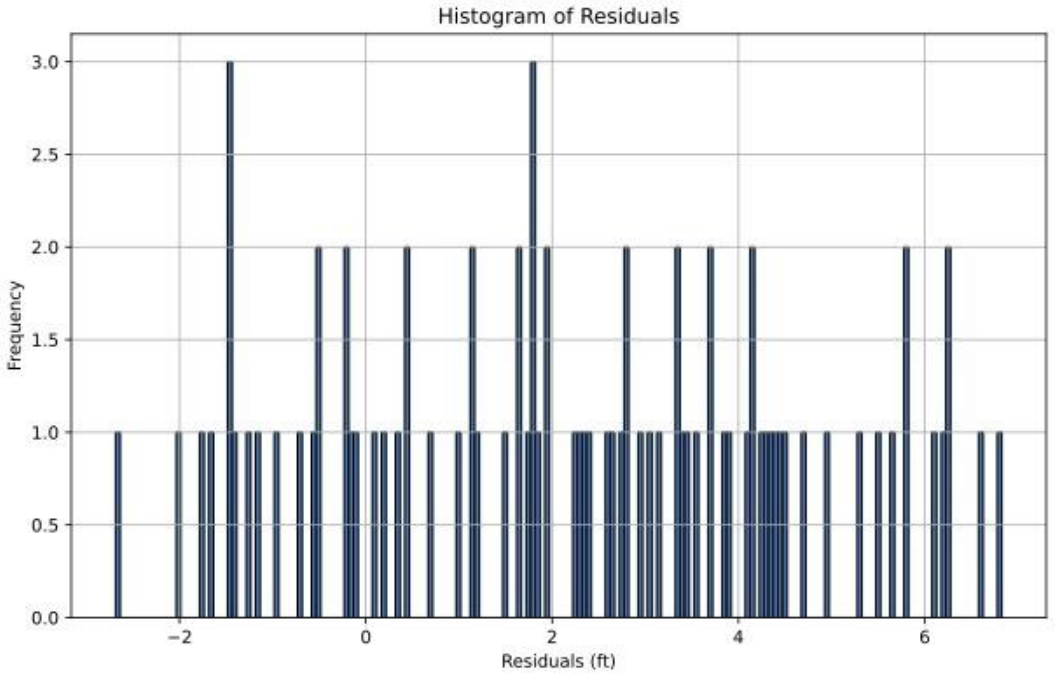
Plotting the model and data on the same graph:



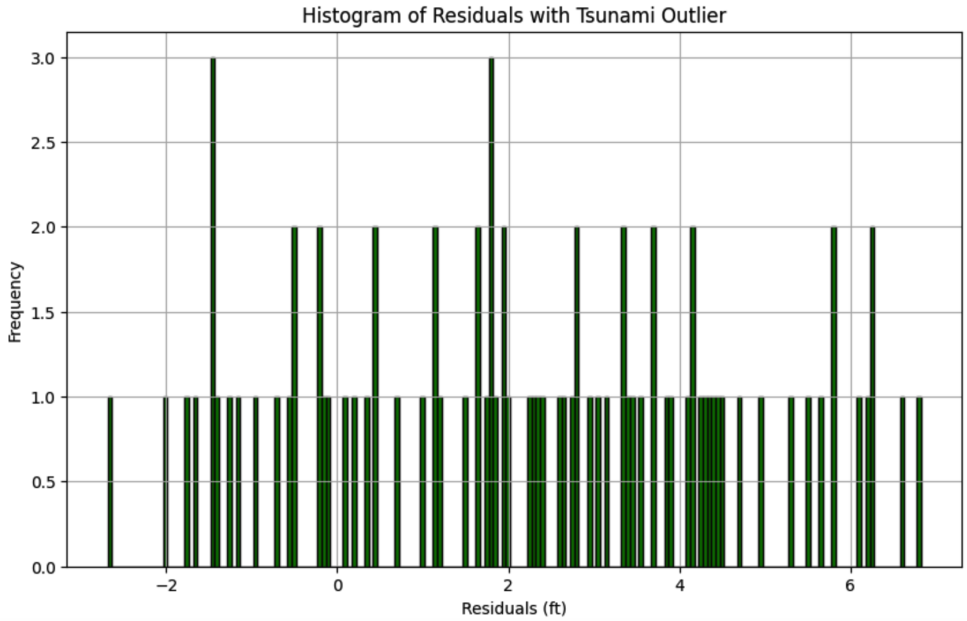
Plotting the Residuals:



Residuals & Standard Deviation Histogram:



Analysis

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Tsunami (Hunga Tonga–Hunga Ha'apai) Deviation in Standard Deviations:-0.09521185244170204
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Clearly articulate how big the Tsunami deviation is in relation to the typical tidal pattern? Consider the standard deviations of the distribution of normal tides from the model? What did you observe?

The Hunga Tonga tsunami event can be seen to be just slightly bigger than the typical tidal pattern

deviation. This can be justified with the provided statistic that the tsunami event 2ft's deviation was only (-0.095211) standard deviations away from the mean of the residuals. This is in line with saying that the tsunami event's deviation was slightly smaller than the standard mean of normal tides, as to say that the tsunami did not have a big impact in creating outliers either.