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Astron 98
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Project “Plan B”

Objectives

Using data of known exoplanets, determining if there is a correlation between habitability and distance from host star are based on various categorical and quantitative data.

Demonstrate basic proficiency in using Python: creating data plots and curve fitting, writing functions to analyze data.

Methodology

Generate Test Data:
Use numpy random functions to test the functionality of our code; pull all exoplanets from NASA Exoplanet Catalog to generate final results.

Data Quality & Reduction:
Filter for only planetary data for relevant categories:
Atmosphere Composition, Temperature, Terrain Type, Size, Mass, Orbital Period, Insulation Flux

Give each attributive category a score of 1 or 0 (true-false), 1 being “alike Earth”, 0 being “unalike Earth”. Divide the total score for each exoplanet by the number of categories to determine the “Habitability” score.

Model Fitting/Model Outcomes:
Plot Habitability vs. Distance from the exoplanet’s host star.

Errors would be accumulated from measurements (e.g. atmosphere composition: oxygen percentage). Errors will be accounted for on a point-by-point basis.

Function to curve-fit to data currently undetermined, but predicting a linear relationship-type function.

Expected Outcomes

Should get a linear correlation of further from star = less habitable.

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References

NASA. (n.d.). *Exoplanet Catalog - NASA Science*. NASA. https://science.nasa.gov/exoplanets/exoplanet-catalog/. Accessed 07 Nov. 2024.

PHL @ UPR Arecibo - Habitable Worlds Catalog. 21 Mar. 2024. https://phl.upr.edu/hwc. Accessed 07 Nov. 2024.