Project 2: Supernova Cosmology Project Handout

This handout is based on the analysis conducted in the Jupyter Notebook titled '2_hubble_parameter.ipynb'. You are expected to run the notebook based on the instructions, review the plots and results, and answer the following questions based on your findings.

Try to mention your approach for the tasks, relevant plots and answers here, attaching the notebook as a PDF (you can do the same from Jupyter)

Questions

1. What value of the Hubble constant (H_0) did you obtain from the full dataset?

2. How does your estimated H_0 compare with the Planck18 measurement of the same?

3. What is the age of the Universe based on your value of H_0? (Assume $\Omega_m = 0.3$). How does it change for different values of Ω_m?

4. Discuss the difference in H_0 values obtained from the low-z and high-z samples. What could this imply?

5. Plot the residuals and comment on any trends or anomalies you observe.

6. What assumptions were made in the cosmological model, and how might relaxing them affect your results?

7. Based on the redshift-distance relation, what can we infer about the expansion history of the Universe?

Your Analysis & Notes

Use the space below to attach any key plots, calculations, or notes from your analysis.

Plot 1: Redshift vs. Distance Modulus

Plot 2: Hubble Diagram with Model Fit

Plot 3: Plot the residual

You can plot any other relevant information you find interesting from the given data. Exploration is the essence of astronomy. Happy exploring !!