Exercise

Attached is the data for plotting HR diagram for a large number of stars.

Calculate absolute magnitude using parallax.

The formula for the same is $m - M = 5 \log_{10}(d) - 5$, where m and M are apparent and absolute magnitudes respectively, and d is the distance in parsecs. Parallax is used to obtain distance to objects. 1 parsec => parallax of 1 arc sec.

Therefore, the equation to use is $d = 1/\theta$, where d is distance in parsecs and θ is parallax angle in arc seconds.

1. Plot absolute magnitude vs color.

2. Make three different plots for below three categories.

(i) stars with parallax uncertainty < 50 mas.

(ii) parallax uncertainty < 100 mas.

(iii) parallax uncertainty > 100 mas.

3. Make another plot with all stars with the data points color-coded by parallax uncertainty. Use argument c in *plt.scatter()* to get the points color coded by the value of parallax uncertainty.