**Week 3-**

* **Filtering Globular Cluster Stars**

Pick ONE globular cluster to start with. Not all will give you good-looking HR diagrams or obvious clustering in pmra-pmdec space. Start with querying for RUWE < 1.4, no other quality cuts on parallax, pmra, pmdec. Next look for clustering in pmra/pmdec space as like open clusters and do a 3 sigma filter if you are not getting a good HR diagram.

* **Isochrones fitting**

Download the isochrone from the website - [CMD 3.7 input form (inaf.it)](http://stev.oapd.inaf.it/cgi-bin/cmd)

Only change the age and metallicity at the end, and change the passbands to Gaia EDR3 - G, BP, RP in the middle

Refer recording for help with this section.

Look up the Wikipedia articles on initial mass function and stellar isochrones.

Convert all data into a CSV file and import the data into your notebook. Then try to fit the isochrones horizontally. For vertically fitting it you need to add some constant along the y axis.

* **Finding Distance**

Now find the absolute magnitude of the horizontal branch. Apparent magnitude is there in your HR diagram - if it’s missing use the red clump to be one magnitude brighter than the HB.

Query for a theoretical isochrone of 12 billion years, -0.6 or -0.9 metallicity to start with. Shift it down to go from absolute to apparent, keep tweaking slightly until you get an overlap on the HB/red clump. Remember you’re not fitting the *whole* isochrone - just a small part of it!

Once you have a good overlap, translate the difference between app and abs mag to distance to cluster using the magnitude formula.

* **Report-** Start filling this ASAP: <https://www.overleaf.com/project/6585a03d1e06672beb908836>

Some of the parts of Introduction are already filled to help you understand how to write the report further.