Homework 2

Due Date/Time: Beginning of class (7 pm), Wednesday, September 20th 2017

Problems

1. From Chromey: Exercise 1.9

2. From Chromey: Exercise 1.13

3. Programming exercise on cluster distributions (submit via Jupyter notebook in Moodle):

Recall that galactic coordinates (*l, b*) of an object locate it in the following reference frame:
• fundamental plane: plane of the Milky Way
• origin: the Sun
• galactic longitude *l*: wraps 360º around plane of the galaxy; *l* = 0º toward the galactic center
• galactic latitude *b*: extends ±90º up to the north and south galactic poles.

The galactic longitude and latitude for 398 open clusters from an article by Ahumada and Lapasset (1995) and for 111 globular clusters from Harris (1976) are posted on the course Github page (https://github.com/kfollette/AST337-Fall2017) in the Homework2 folder. They are named, respectively, *galactic.open.dat* and *galactic.glob.dat.*

NOTE: Coordinates for open clusters are in the order *l, b* while for the globular clusters they are *b, l.*

a. Download the two data files for open clusters and globular clusters and read the data into python using pandas.
b. Make two plots, one showing the distribution of open clusters and one showing the distribution of globular clusters. Each plot should have galactic longitude *l* on the X-axis, with limits from −180º to +180º, and galactic latitude *b* on the Y-axis, with limits from −90º to +90º. Use identical limits for both plots, and be sure to label your axes and units. On each plot identify the location of the galactic plane and the galactic center.
(Note: You will have to convert the longitudes from 0 to 360º to -180º to + 180º)
c. Carefully **describe** the distribution of open and globular clusters, discussing their similarities and differences in both (1) galactic latitude and (2) galactic longitude. What are the implications of these distributions? Answer as quantitatively as possible.

Pre-Lab Reading and Questions for Week 3

Reading

Please read the following sections in Chromey:

- Chapter 5
- Chapter 6 through the end of section 6.2

Questions

1. Pick the three terms from the list in the first bullet of the Summary on page 146 with which you are *least familiar* and define them in your own words.
2. What is atmospheric dispersion, how might it manifest itself in an astronomical image, and for what wavelengths and elevations in the sky do you need to correct for it?
3. Describe the relationship between the Airy pattern and the diffraction limit of a telescope.
4. For what type of telescope is chromatic aberration a concern?
5. Where in an image does one worry about spherical aberration and where do aberrations like coma and astigmatism come into play?
6. Describe one advantage and one disadvantage of each type of telescope mount (altaz and equatorial).
7. Write down three important/main points from this week's reading.
8. What concepts did you find unclear in this week's reading?