Problem Set #2

Due Wednesday, October 9 by 5pm to Dickinson 104

Unless otherwise indicated, all numbered problems come from "To Measure the Sky." Also, unless otherwise indicated, assume all observations take place from Bennington.

1. The sidereal time in Greenwich on March 1, 2024 at midnight is 10h 37m 10s. On April 1, 2024, the sidereal time in Greenwich at midnight is 12h 39m 23s. What is the Local Sidereal time in Bennington at 3:30am EST on March 25, 2024? Has a galaxy with RA=12.5h transited at this point? If so, how long since it transited? If not, how long until it transits? (*Note: Online calculators can easily show you the LST for this time and date. As a result, you **must** show the steps you took to calculate the LST. You are welcome to use the online calculators to check your work.)*
2. Problem 3.6
3. Problem 3.7 *Instead of a celestial sphere, use a piece of software like Stellarium. Make sure to explain how you arrived at the answer you arrived at.*
4. Problem 3.2
5. Problem 3.4 (*Hint: You'll need to use full spherical trig for the first part of this problem but you can use the fact that r, $\Delta\alpha$, and $\Delta\delta$ are all small to simplify the expressions. Also, for small angular separations, a spherical triangle becomes a planar triangle. Your terms for $\Delta\alpha$ and $\Delta\delta$ should be in terms of r, δ, and θ.*)
6. Problem 3.5
7. Look up the coordinates of Aldebaran for the equinox of 2000.0. Calculate the annual precession and determine the coordinates of Aldebaran for the year 2001.0.
8. Calculate the ecliptic coordinates of Vega from its equatorial coordinates.