AST 250 – Spring 2019
Homework Due: Friday Jan. 25

6. Calculate the angular separation in degrees of two stars with coordinates (10h, +80d) and (11h, +70d).

(a) Do the problem first assuming flat Euclidean geometry. Draw a perpendicular coordinate system with α on the x-axis and δ on the y-axis that is flat in a plane. What is the angular separation between the stars (in degrees)?

(b) Now do the problem correctly using spherical geometry. Show that the difference between the two answers is substantial. Hint: when you draw the spherical triangle, don't worry about alt-az/horizon coordinates – start with a sphere with the NCP at the top and the SCP at the bottom (See Figure 1).

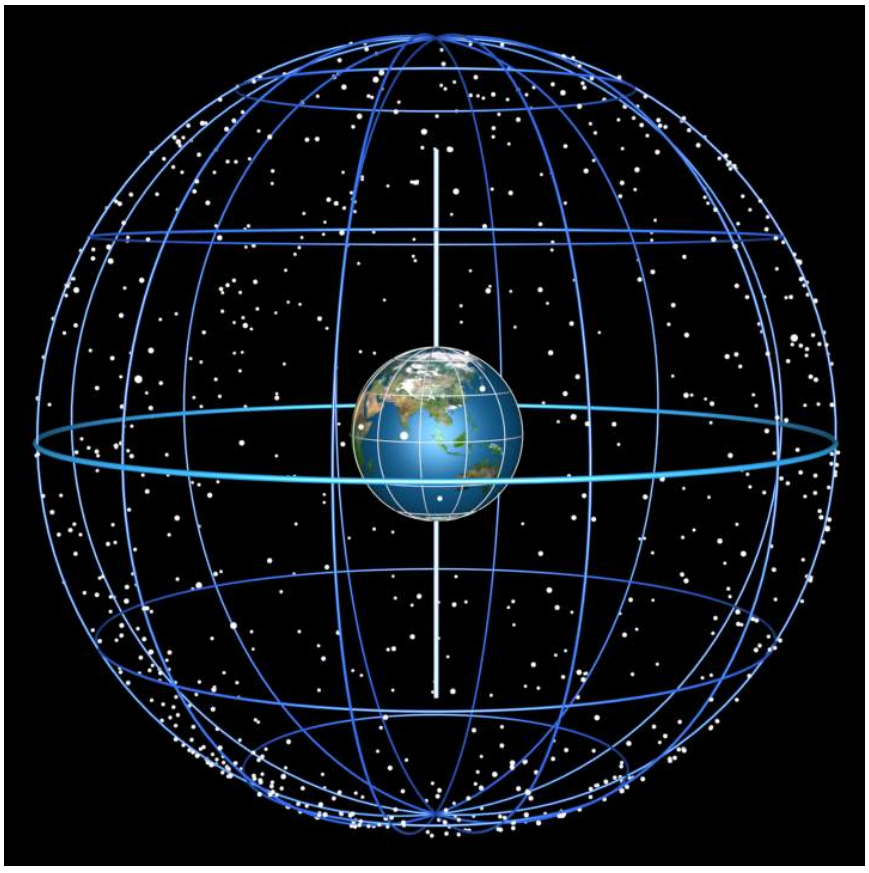

Figure 1: The celestial sphere.

7. Derive a general formula for the Hour Angle (HA) of a source that is setting which is only a function of latitude of the observer (ϕ) and declination (δ) of the source. How would you modify this equation for the Hour Angle of a source that is rising? NOTE: Since LST = HA + α, you can use this equation to figure out the LST of when a source with coordinates (α,δ) will rise and set from your latitude (ϕ) on Earth.

Figure 2: The setting Sun.