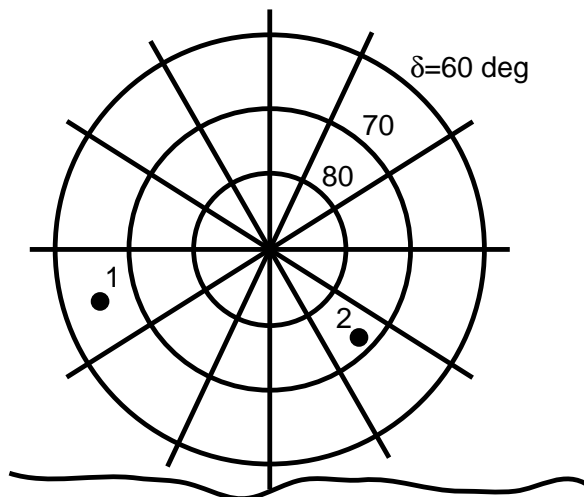


1: The figure below shows lines of constant right ascension and declination in the region near the North Celestial Pole.



- Estimate roughly the latitude of the site shown in the figure.
- Estimate roughly the values of declination and hour angle for the two stars shown in the figure.
- Estimate the altitude of star number 1 at upper and lower transit.
- What will the hour angle of star number 2 be at lower transit. What will its altitude and azimuth be at this point?
- Suppose star number 1 has a right ascension of $\alpha = 8$ h. Estimate the local sidereal time (LST) for the figure.

2: Go to tycho.usno.navy.mil/sidereal.html (or any number of web sites) to find the current local sidereal time in Egham. What will the LST be 15 sidereal days later? What will be the LST 15 solar days later?

3: The star Vega is at right ascension $\alpha = 18$ h 37m and declination $\delta = 38^\circ 47'$. Egham is at latitude $\phi = 51^\circ 26'$ N and longitude $\lambda = -0^\circ 34'$. On 30 September 2007 at 9:30 p.m., I find the Greenwich Sidereal Time GST = 21h 6m. For an observer in Egham, find the following:

- What is the hour angle of Vega at this time?
- What are the altitude and azimuth of Vega at this time?
- At what sidereal time is (or was) Vega's upper transit?
- At what time BST is its upper transit?