PHY517 / AST443: Observational Techniques

Homework 1

1. If you have not done so, fill out the pre-class survey (https://goo.gl/forms/jHbiEHcrWO3kXoNr1).
2. Form your observational team (a group of 3 people). Send an e-mail to the instructor with your team members as soon as you have formed the team.
3. Read the Course Notes for PHY517 / AST443[1] and for PHY515 / PHY445[2] (pages 1-13).
4. Read the wiki pages on Computing Resources[3] and on Astro Software Overview[4].
5. Your code returns a number of $99.123456789 \pm 0.00455679$ for your calculation. How should you report it in your lab write-up?
6. On the days of the equinox (day and night are equal length), at what azimuth angle does the Sun rise? Where does it set?
7. The celestial coordinates of the star Altair are approximately $19^{\rm h}50^{\rm m}, +08^\circ52'$.
   - What is the maximum altitude it can be seen from Stony Brook?
   - What is its distance from the zenith then?
   - At a Local Sidereal Time (LST) of $18^{\rm h}50^{\rm m}$, what is the hour angle of Altair? Is it to the East or to the West of the meridian?
8. Let's practice finding an object:
   - Convert your birthday to a position on the sky using the following transformation:
     - Multiply the month of your birthday by 2. This number becomes the right ascension (if the result is $24^{\rm h}$, make it $0^{\rm h}$).
     - Subtract 2 from the day of your birthday, and multiply the result by 3. This number becomes the declination.
   - Look up the resulting sky position on `simbad`[5]. Search for all objects within at least 0.5 degrees.
   - Sort the results by the number of references, and pick the most referenced object.
   - Make a finding chart for this object using the AAVSO finding chart tool[6]. The finding chart should be 15 degrees across, and be orientated as if you were looking at the sky with the naked eye.

[1] https://github.com/anjavdl/PHY517_AST443/blob/master/documents/phy517_ast443_specifics.pdf
[2] https://github.com/anjavdl/PHY517_AST443/blob/master/documents/phy515_445_course_notes.pdf
[3] https://github.com/anjavdl/PHY517_AST443/wiki/Computing-Resources
[4] https://github.com/anjavdl/PHY517_AST443/wiki/Astro-Software
[5] http://simbad.u-strasbg.fr/simbad/sim-fcoo
[6] https://www.aavso.org/apps/vsp/

- Use the ING StarAlt tool[7] to determine when your object is best visible from Stony Brook. The higher up in the sky it is, the better visible it is. Save one figure for each of the 4 modes of StarAlt, choosing the best observing date when appropriate. Note that Mt Stony Brook is not a predefined option in StarAlt, so you have to enter the coordinates manually (pay attention to the format!).

Note: for the next homework, you will need to include these figures into a LaTeX document, so make sure to save them to disk.

[7] http://catserver.ing.iac.es/staralt/index.php