

GRS AS 710 HOMEWORK #7

Due: Friday, November 6, 2009

You wish to determine the color and magnitude of a particular star, called *Star X*. On one particularly clear night, you run upstairs to the 14" and collect data on *Star X* and a standard star, called *STD*. You know, from examining the Nautical Almanac, that the standard has the following properties:

$V_0 = 9.015$ and $(B - V)_0 = +0.230$, where the subscript 0 means “outside the atmosphere.”

Your log of observations for the night is as follows:

Airmass	Star	Filter	Photons
1.015	STD	V	1,214,212
1.020	STD	B	1,624,134
1.305	STD	B	1,493,256
1.315	STD	V	1,087,178
2.016	STD	V	839,791
2.322	STD	B	1,106,523
1.230	Star X	V	3,768
1.233	Star X	B	3,518
1.236	Star X	V	3,767
1.239	Star X	B	3,520
1.240	Star X	V	3,766
1.243	Star X	B	3,419
1.245	Star X	V	3,746
1.249	Star X	B	3,510
1.255	Star X	V	3,728
1.260	Star X	B	3,493
1.270	Star X	V	3,694
1.275	Star X	B	3,447

Write an IDL routine to help you determine the answers to the following questions (be sure to turn in a copy of your programs, as well as the outputs and question answers):

1. What was the extinction and its uncertainty that night in the **V** wavelength?
2. What was the extinction and its uncertainty that night in the **B** wavelength?
3. What were the **V** and **B** offset magnitudes and their uncertainties?
4. What were the unextincted count rates and their uncertainties for *Star X* at **V** and **B** for each observation?
5. What were the mean **V** and **B** instrumental magnitudes and their uncertainties, outside the atmosphere, for *Star X*?
6. What were the corrected magnitude (and uncertainty) and color (and uncertainty) for *Star X*?
7. How do your measured uncertainties compare to your expected uncertainties? What conclusions might you draw?