HW 4: Optical CCD Analysis

Plate scale is 1.89 $\frac{\text{arcsec}}{\text{pixel}}$

1 A. typical FWHM $\approx$ 2.5 pixel $\approx$ 4.7 arcsec
B. good choice for aperture_radius $\cong$ 7 pix $\cong$ 13″
C. " " " aperture_innersky $\cong$ 10 $\cong$ 19″
D. " " " aperture_outersky $\cong$ 20 $\cong$ 38″

2. A. Make a table – OK
B. See "graph_2b.png"

3.

Star	V-band in APASS catalog
A	11.863
B	12.875
C	12.335

D. I picked image # 100

E. For my measurements

star	instr mag
A	12.414
B	13.402
C	12.844
ASAS	12.748

3F.

star	instrumental	V-band	$\Delta \equiv$ (instr − V)
A	12.414	11.863	0.551
B	13.402	12.875	0.527
C	12.844	12.335	0.509

Yes, all three stars yield $\Delta \approx 0.53 \pm 0.02$.

G. So, we can convert the instrumental mag of ASAS to an approximate V-band mag:

$$V \cong \text{instrumental mag} - \Delta$$

$$= 12.748 - 0.53 \cong 12.22$$

4. A-C: Okay, I did that

D: I will choose star A as my reference, because it is the brightest

E. see "graph_4e.png"

F. the calibrated light curves show smaller long-term trends than the instrumental light curves. This is due in large part to clouds and air affecting all stars in exactly the same way.

5. A Period is about $0.^d061 \approx 1.46$ hours ≈ 88 min ≈ 5260 sec.

B. Kato, T. et al., PASJ 67, 105 (2015) gives $P \approx 0.^d060$

C. Our value was very close!