HW 4: Differential Photometry.

A. See graph

B. All four stars are changing significantly in instrumental magnitude. It is not clear that IY is any special object.

C. Perhaps clouds were passing over the field during this set of exposures, so that the atmospheric extinction changed significantly over timescales of 10-20 minutes.

D. Done.

E. See "differential mag" graph.

F. Now stars A and C are barely changing, relative to B. But star IY is very significantly changing, relative to B (and both other stars).

G.

star	UCAC ID	V-mag	diff mag	Δ
A	741-049891	12.200	-1.232	13.432
B	741-049897	13.591	0.000	13.591
C	741-049895	13.286	-0.129	13.415

H. Using differential mags from first image, we see $\Delta \equiv (V - \text{diff}) \approx 13.5$ mag for all three.

I. I will choose a value of

$$\Delta = 13.45 \text{ mag}$$

for my calibration, giving greater weight to the stars A and C, which have similar values.

Then, the V-band mag of IY is given by

Image 1: V = diff mag in image 1 + 13.45
= 0.458 + 13.45 = 13.908

Image 2: V = diff mag in image 2 + 13.45
0.505 + 13.45 = 13.955

etc.

J. See "calibrated mag" graph.