Hw 7, #2

This problem involves the SN 2018 jky and its host NGC 1329. Based on data from Vizier, one can create a light curve.

See sn2018jky-b.png

From the graph, one can see

peak $m_B \cong 15.40$ at JD $\cong 2458469$

15 days later $m_B \cong 17.02$ 2458484

$\Delta m_{15} \cong 17.02 - 15.40 \cong 1.62$

We can estimate the absolute mag via

$$M_B = -19.325 + 0.636(\Delta m_{15} - 1.10)$$

$$= -18.99$$

So

$$m_B - M_B = 15.40 - (-18.99) = 34.39$$

We can derive the distance

$$m_B - M_B = 34.39 = 5 \log D - 5$$

$$\rightarrow D = 10^{(34.39+5)/5} = 76 \text{ Mpc}$$

HW 7, #2 Continued.

NED shows another distance estimate to this galaxy, from the 6dF Galaxy Survey (Springob et al., MNRAS 445, 2677 (2014))

dist D = 84.3 Mpc

method = fundamental plane

NED also states that the extinction to this galaxy in B-band is

$$A_B = 0.162 \text{ mag}$$

In this case, the true apparent mag should be

$$\text{corrected peak mag } m_B = 15.40 - 0.162 = 15.24$$

Thus the corrected distance modulus is

$$\text{corr dist mod} = 15.24 - (-18.99) = 34.23$$

And corrected distance is

$$\text{corr } D = 10^{(34.23+5)/5} = 70 \text{ Mpc}$$