Computational Methods in Astrophysics- HW6

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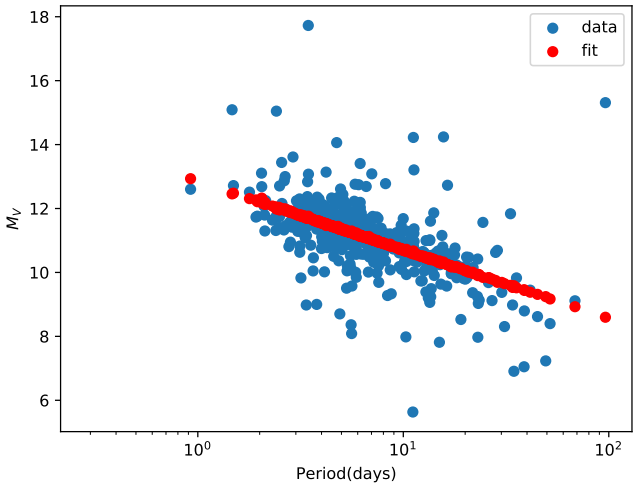
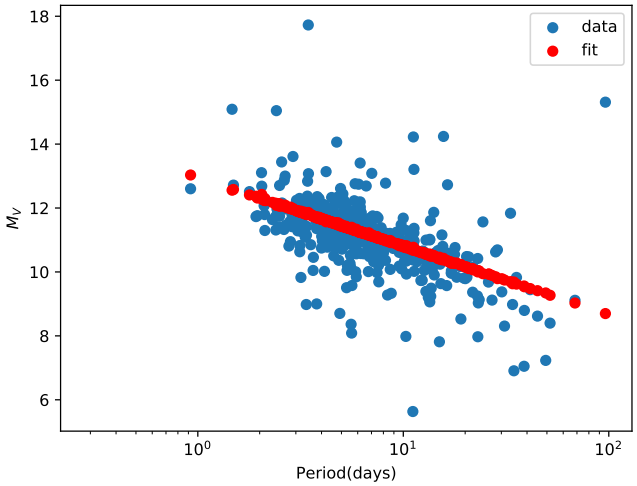
1. Given E(B-V), R_V, m_V, period, Z(metallicity) and distance to the star, we can calculate A_V=R_V $*$ $E(B-v)$, and hence $M_V = m_V - 5 * log(d) + 5 - A_V$.
   $M_V = \alpha + \beta * log(P) + \gamma * Z$
   Performing a linear least squares fitting to the above equation I get the values for the parameters with their uncertainties as
   $\alpha = 12.84018113 \pm 0.143052598123$,
   $\beta = -2.12690846 \pm 0.1676473246898537$,
   $\gamma = -0.09353132 \pm 0.25234995714561903$.

2. Following is a plot of the data and the fit performed on it with period(log-scale) on the x-axis and V-band absolute magnitude on the y-axis. As we can see, it seems like a good fit.



3. Taking into consideration the errors(σ_m=0.1) on evaluation of the apparent magnitudes as well, following are the parameter fits with their uncertainties
   $\alpha = 12.94018113 \pm 0.143052598123$
   $\beta = -2.12690846 \pm 0.1676473246898537$
   $\gamma = -0.09353132 \pm 0.25234995714561903$



4. Bonus: To be attempted