Homework #5

1. Calculate the mass function from the radial velocity curve in Figure 5.6 of Kutner. What does this tell you about the mass of the unseen star?

2. Derive the relative velocity of the two stars at periastron and at apastron from the following figure.

3. Use the Saha equation

\[ \frac{n_e n(H^0)}{n(H^-)} = \frac{2 g(H^0)}{g(H^-)} \left( \frac{2 \pi m_e kT}{\hbar^2} \right)^{3/2} e^{-E_1/kT} \]

and data from the attached Solar Photospheric Model to estimate the fraction of hydrogen that is in the $H^-$ ion at the $\tau = 1$ level. You may assume that the statistical weights are $g(H^0) = 2$ and $g(H^-) = 1$. 