Project for CTA200H

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1 Question 2

1.1 Question 2.3: How does the radial velocity curve depend on each of these?

As the mass of the star increases, the period decreases and the magnitude of the radial velocity oscillation decreases and vice versa.
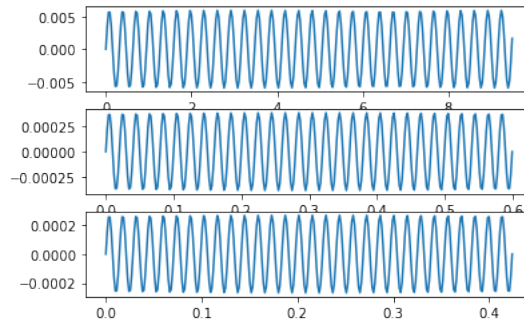

Figure 1: RV plot when the mass of the star changes

As the mass of the planet increases, the period decreases and the magnitude of the radial velocity oscillation increases and vice versa

As the semi major axis of the planet increases, the period decreases and the magnitude of the radial velocity oscillation decreases.
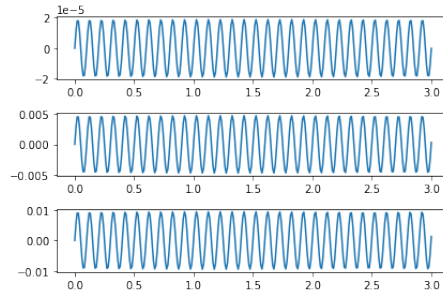
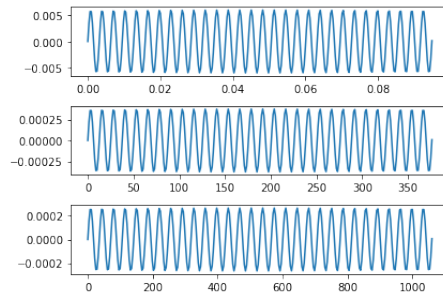Figure 2: RV plot when the mass of the orbiting planet changes

Figure 3: RV plot when the semi major axis of the orbiting planet changes

1.2 Question 2.4: What changes when $e = 0.3$?

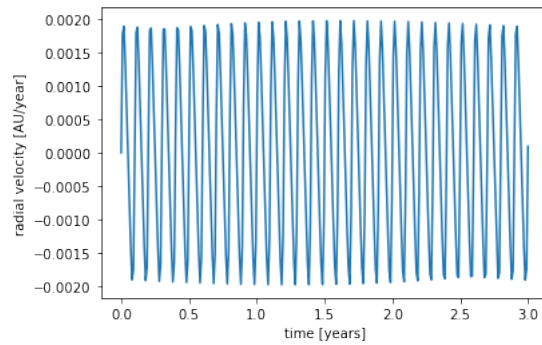The RV curve is no longer a plane wave. The peaks also oscillate.

Figure 4: RV plot when e-0.3

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2 Question 3

2.1 Question 2.5.5: Are the values similar to those which RS2017 found?

The values found are similar (within the error bar) of what RS2017 found.

2.2 Question 2.5.6: The values with errors?

The estimated error bars are:

m_1: $0.941839713 \pm 1.29144185 \times 10^{-2}$
m_2: $0.869533382 \pm 1.30311416 \times 10^{-2}$
a_1: $0.658420910 \pm 8.79431067 \times 10^{-3}$
a_2: $1.04188007 \pm 1.33763092 \times 10^{-2}$
M_1: $93.2194881 \pm 1.56581118$ M_2: $182.084202 \pm 2.71507998$
h_1: $0.153473237 \pm 1.81059100 \times 10^{-3}$
h_2: $8.05361883 \times 10^{-2} \pm 1.01197608 \times 10^{-3}$
k_1: $-8.34870780 \times 10^{-2} \pm 1.14976032 \times 10^{-3}$
k_2: $-6.32399766 \times 10^{-2} \pm 9.87196198 \times 10^{-4}$
γ: $3.8568885 \pm 5.29191840 \times 10^{-2}$
σ_j: $2.95393147 \pm 3.88170120 \times 10^{-2}$

2.3 Question 2.5.7: Does the fit look good?
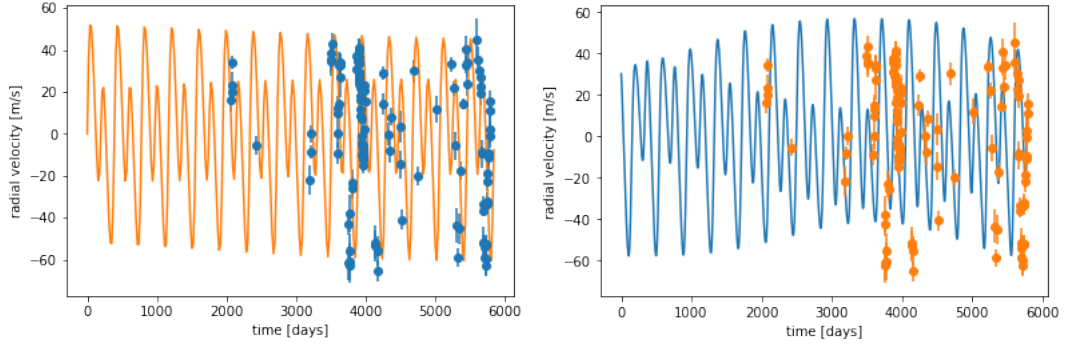
The fit does not look good, compared to the fit from the paper.

Figure 5: Left: Parameters from RS2017 Right: Parameters from emcee