Problem2

8.1&8.2

8.1

According to Law of mass action:

$$v[E] = k_3[ES] + k_2[ES] - k_1[E][S]$$
$$v[S] = k_2[ES] - k_1[E][S]$$
$$v[ES] = k_1[E][S] - k_2[ES] - k_3[ES]$$
$$v[P] = k_3[ES]$$

8.2

The code has been uploaded to Github, A threshold of 0.0001 is preset which implies if the diff of two derivation is smaller than 0.0001, the ~~reaction~~ iteration will be ceased. It is a reasonable assumption to say the concentrations of all four substrates are stable when the rate of change is small. According to the output, eventual concentration of E, S, ES, P will be ~~0.597147, 9.547000, 0.402853~~ ~~and 0.050170~~ respectively. However, it is based on an assumption, and the result is likely to be not the truth.

↳ Correct, they are 0.927090, 0.577500, 0.072910 and 9.349590 respectively unit is Mg kind of weird number.

8.3

It turns out the maximum reaction speed will converge to approximately 140ug/min.