8.1

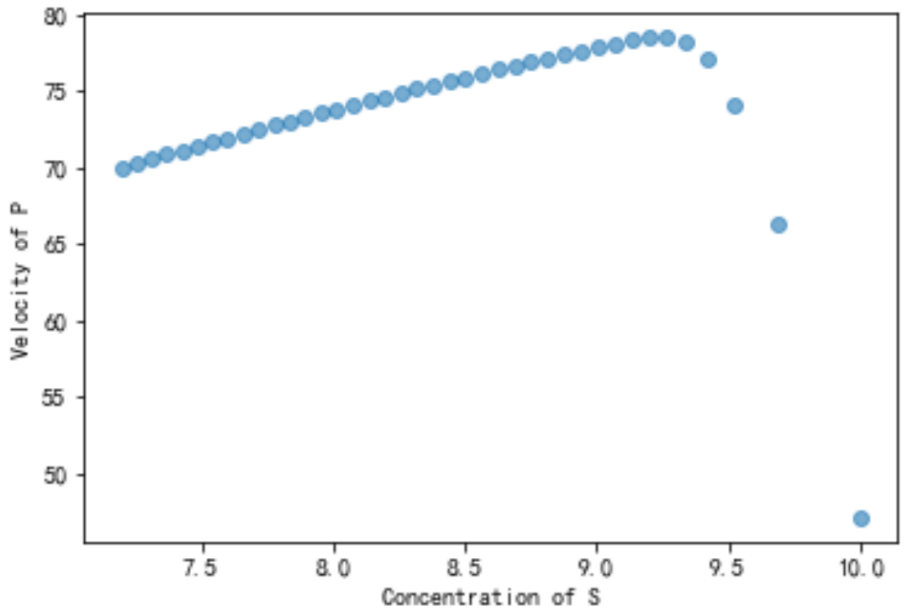
Four equations for the rate of change of the four species:

$$\frac{dE}{dt} = -k_1[E][S] + k_2[ES] + k_3[ES]$$
$$\frac{dES}{dt} = k_1[E][S] - k_2[ES] - k_3[ES]$$
$$\frac{dS}{dt} = -k_1[E][S] + k_2[ES]$$
$$\frac{dP}{dt} = k_3[ES]$$

8.2

The code is in Question_2

8.3



We can see that, when the concentrations of S are small, the velocity V increases approximately linearly. But, when the concentrations of S are large, the velocity V saturates to a maximum value Vm.

The Vm is 78.48

```
Vm=max(parray)
print(Vm)
```

```
78.48488937982125
```

The code can be found in Question_2