Question 2: Enzyme Kinetics

8.1. Using the law of mass action, write down four equations for the rate of changes of the four species, E, S, ES, and P.

For *E*:

$$\frac{d[E]}{dt} = -k_1[E][S] + (k_2 + k_3)[ES]$$

For *S*:

$$\frac{d[S]}{dt} = k_2[ES] - k_1[S][E]$$

For *ES*:

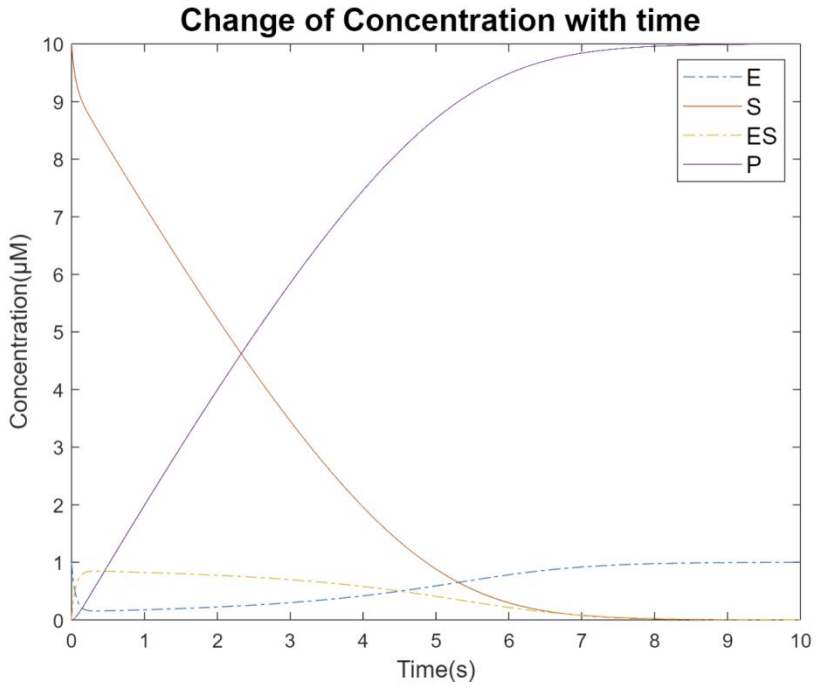
$$\frac{d[ES]}{dt} = k_1[S][E] - (k_2 + k_3)[ES]$$

For *P*:

$$\frac{d[P]}{dt} = k_3[ES]$$

8.2. Write a code to numerically solve these four equations using the fourth-order Runge-Kutta method. (Please see the code file and readme document)

	t=0	t=1	t=2	t=3	t=4	t=5	t=6	t=7	t=8	t=9	t=10
[E]	1.00000	0.17563	0.22441	0.29984	0.41835	0.59081	0.78331	0.91867	0.97677	0.99430	0.99869
[S]	10.00000	7.18588	5.23052	3.45418	1.95959	0.88315	0.29720	0.07770	0.01786	0.00395	0.00087
[ES]	0.00000	0.82437	0.77559	0.70016	0.58165	0.40919	0.21669	0.08133	0.02323	0.00570	0.00131
[P]	0.00000	1.98974	3.99389	5.84566	7.45877	8.70766	9.48612	9.84097	9.95891	9.99035	9.99783



8.3

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 Maximum V is 2.1137
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