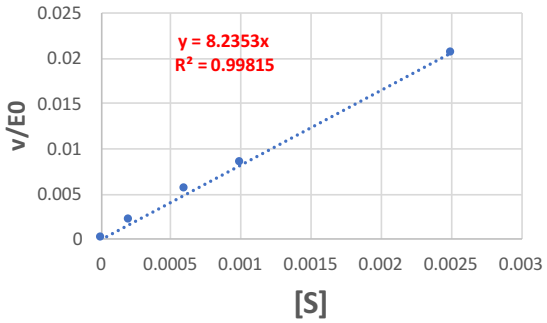
This assignment deals with fitting of the Michaelis Menten kinetics for a given enzyme. Substrate concentration [S] and the rate normalized to the enzyme concentration (i.e. v/E_0) is provided for your convenience. Use the approximation method that at high and low substrate concentration and obtain k_{cat} and K_M from this procedure. Write the answer for the first 2 questions in the piece of paper, scan to make file 1. The following two questions carry 5 marks in total.

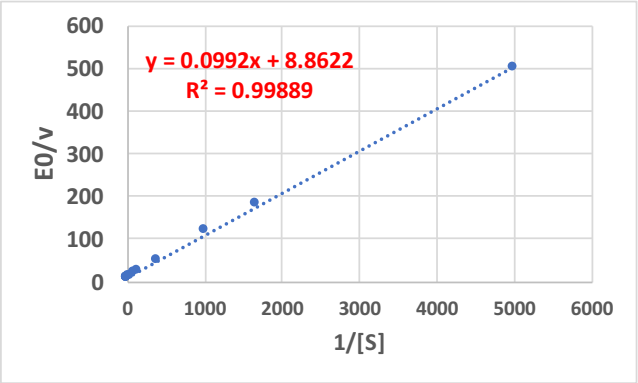
[S]	v/E_0
(M)	($s^{-1}.M^{-1}$)
0	0.0000
0.0002	0.0020
0.0006	0.0055
0.001	0.0083
0.0025	0.0204
0.007	0.0436
0.01	0.0576
0.025	0.0871
0.06	0.1102
0.15	0.1347
0.25	0.1306
0.6	0.1371
1	0.1400
2	0.1449
5	0.1426

1. Use the data from [S] at 2.0 and 5.0 M to estimate k_{cat}. (round off to 3 decimals)
   Average of k_{cat} 0.1449 and 0.1426 is 0.1435, which is rounded off to 0.144.

2. Use the first 5 data points, use the k_{cat} from above and provide the value for K_M. Hint: set intercept to zero while fitting. (round off to 3 decimals)
   Slope: 8.2353 units = k_{cat}/K_M
   K_M = 0.017



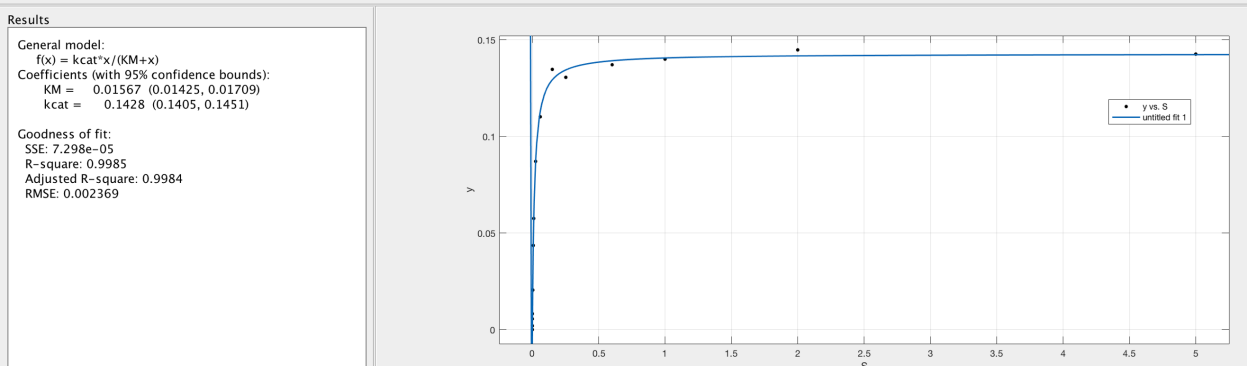
Use the linearized form of the equation, i.e. the Lineweaver Burk plot, where you can plot E_0/v as a function of 1/[S]. Save the matlab/excel sheet fits as a picture (file 2), using the numbers from this write the following in piece of paper and scan to make file 3. The following two questions carry 10 marks in total.



3. Use the slope information to estimate k_{cat} (use the average value obtained from the fit only). (round off to 3 decimals)
   Minor error in the question, intercept would provide k_{cat}
   Intercept = 8.8622 = $1/k_{cat}$
   k_{cat} = 0.113 units

4. Use the intercept information to estimate K_M (use the average value obtained from the fit only). (round off to 3 decimals)
   Minor error in the question, slope with provide information of K_M
   K_M = 0.0992*0.113 = 0.011 units

Use the Michaelis Menten form to obtain the value of k_{cat} and K_M. Fit using the cftool in MATLAB as taught in the lectures, save the final fit as a figure (file 4). The following question carries 15 marks in total. Write the following answers in a paper and scan it (file 5).



5. Write the average value of k_{cat} obtained from this method. (round off to 3 decimals)
   k_{cat} = 0.143 units
6. Write the average value of K_M obtained from this method. (round off to 3 decimals)
   K_M = 0.016 units