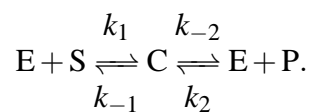


# Chemistry 5850 Fall 2005 Assignment 2

Due: Monday, September 26.

Weight of this assignment: 38 marks

1. Consider the fully reversible Michaelis-Menten mechanism:



- Write down the rate equations, and show that there are two conservation relations, namely conservation of enzyme and of substrate. [4 marks]
  - Obtain a pair of differential equations which completely describe the dynamics of this system, and transform them to a dimensionless form. [4 marks]
  - Carry out a complete phase plane analysis of your system of equations, including a linearized stability analysis. [20 marks]
2. Consider a Hooke's law spring with an added velocity-dependent force  $f(v)$ . Use a Liapunov function argument to determine the conditions on  $f(v)$  such that the equilibrium point  $(x = 0, v = 0)$  is stable. [10 marks]