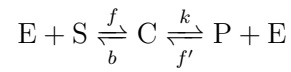


1. We will derive the equivalent of the Michaelis-Menten equation for the reversible enzymatic reaction:



Show that the quasi-steady state approximation implies that

$$C = \frac{(fS + f'P)E_{\text{tot}}}{b + k + fS + f'P}$$

and by simplifying the rate equation for  $P$  that

$$\frac{dP}{dt} = E_{\text{tot}} \cdot \frac{k \frac{S}{K_m} - b \frac{P}{K'_m}}{1 + \frac{S}{K_m} + \frac{P}{K'_m}}$$

with

$$K_m = \frac{b+k}{f} \quad ; \quad K'_m = \frac{b+k}{f'}$$

Confirm that the result recovers the standard Michaelis-Menten equation when  $f'$  is zero. Explain why this enzymatic reaction has 'product inhibition'.