Chapter 4.
Page 134. Panel 4.20

\( i \) and \( I \) binding reaches equilibrium rapidly.

\[ I = \frac{I_s}{K_{i+I}} \quad (\text{Eq. 4-81}) \]

\( I_s \) steady state concentration of \( I \)

Combine Eqs. 4-79 and 4-81,

\[
\frac{dO_2}{dt} = \frac{I - O_2}{K_{i+I} + I} - \frac{I - O_2}{K_{i+I}}
\]

\[ = \frac{I - O_2}{K_{i+I} + I} - \frac{I - O_2}{K_{i+I}} \quad (\text{Eq. 4-82}) \]

\[
O_2 = \frac{v_r}{K_{i+I} + I} \quad (\text{Eq. 4-83})
\]

\[ v_r = \frac{\psi I}{K_{i+I} + I} \quad (\text{Eq. 4-84}) \]

Define: \( \psi = \frac{K_{i+I}}{K_{i+I} + I} \) \quad (\text{Eq. 4-85})

\[ K_{i+I} = \frac{K_{i+I}}{K_{i+I} + I} \quad (\text{Eq. 4-86}) \]

Transcription rate:

\[ \eta_t = \frac{V_t}{K_{i+I}} \quad (\text{Eq. 4-87}) \]


Corrected Version

\( I = \frac{I_s}{K_{i+I}} \quad (\text{Eq. 4-81}) \)

Combine Eqs. 4-79 and 4-81,

\[
\frac{dO_2}{dt} = \frac{I - O_2}{K_{i+I} + I} - \frac{I - O_2}{K_{i+I} + I}
\]

\[ = \frac{I - O_2}{K_{i+I} + I} - \frac{I - O_2}{K_{i+I} + I} \quad (\text{Eq. 4-82}) \]

\[
O_2 = \frac{v_r}{K_{i+I} + I} \quad (\text{Eq. 4-83})
\]

\[ v_r = \frac{\psi I}{K_{i+I} + I} \quad (\text{Eq. 4-84}) \]

Define: \( \psi = \frac{K_{i+I}}{K_{i+I} + I} \) \quad (\text{Eq. 4-85})

\[ K_{i+I} = \frac{K_{i+I}}{K_{i+I} + I} \quad (\text{Eq. 4-86}) \]

Transcription rate:

\[ \eta_t = \eta_{ax} \frac{V_t}{K_{i+I}} \quad (\text{Eq. 4-87}) \]
Chapter 5
Page 177-178
Problem C2,C3,C4
Problem C3 and C4 should be the continuation of Problem C2.
Chapter 8.
Page 259, Problem A4.
Add to the end of problem A4: “Assuming diffusion is the main mechanism of oxygen transfer, calculate the concentration seen by the stem cell.”
When the column is saturated, \( q_f = Ky_f \)

- the total amount adsorbed is

\[
M = (1 - \varepsilon)Vq_f = (1 - \varepsilon)VKy_f \quad \text{(Eq. 14-11)}
\]

- At that time, the liquid phase has \( \varepsilon V y_f \). The total solute in the column is \( (\varepsilon + (1 - \varepsilon)K)V y_f \)

Time to saturate the column with the solute is

\[
\theta_s = \left(1 + \frac{(1 - \varepsilon)K}{\varepsilon}\right) \theta \quad \text{(Eq. 14-12)}
\]