**siRNA MODEL**

$S_0$: Amount/Concentration of siRNA delivered at $t=0$.

**REACTION MODEL**

\[ S + m \xrightarrow{k_1} C \xrightarrow{k_2} S \]

1. \[ \dot{C} = k_1 m \cdot S - (k_1 + k_2) C = 0 \]
   \[ \Rightarrow C = \frac{k_1 m \cdot S}{k_2} \]

2. \[ \dot{s} = -\gamma_s s - k_1 m S + (k_1 + k_2) C = -\gamma_s s \Rightarrow s(t) = S_0 e^{-\gamma_s t} \]

3. \[ \dot{m} = \alpha_m - \gamma_m m - k_1 m S + k_2 C \]

From (1): \[ C = \frac{k_1 m}{k_2 + k_2} \cdot S \]

From (2): \[ \dot{m} = \alpha_m - \gamma_m m - k_2 \frac{k_2}{K_m} m \cdot S = 0 \]

Should hold after mRNA has equilibrated with siRNA.

\[ \Rightarrow m = \frac{\alpha_m}{\gamma_m + \frac{k_2}{K_m} S(t)} = \frac{\alpha_m/\gamma_m}{1 + \frac{k_2 S_0 e^{-\gamma_s t}}{\gamma_m K_m}} \]