$$
\begin{aligned}
A &= \sum_{i=0}^{+\infty} \theta_i \\
V_{ads} &= V_0 * \sum_{i=0}^{+\infty} i * \theta_i \\
q &= \frac{V_{ads}}{A} \\
r_{c0} &= k_1 * P * \theta_0 \\
r_{c1} &= k_2 * P * \theta_1 \\
r_{ci} &= k_{i+1} * P * \theta_i \\
r_{e1} &= k_{-1} * \theta_1 \\
r_{e2} &= k_{-2} * \theta_2 \\
r_{ei} &= k_{-i} * \theta_i \\
r_{ei} &= r_{ci-1} \\
r_{e1} &= r_{C0} \\
k_{-1} * \theta_1 &= k_1 * P * \theta_0 \\
\theta_1 &= (\frac{k_1}{k_{-1}}) * P * \theta_0 \\
y &= \frac{k_1}{k_{-1}} * P \\
\theta_1 &= y * \theta_0 \\
r_{e2} &= r_{C1} \\
k_{-2} * \theta_2 &= k_2 * P * \theta_1 \\
\theta_2 &= (\frac{k_2}{k_{-2}}) * P * \theta_1 \\
x &= (\frac{k_2}{k_{-2}}) * P \\
\theta_2 &= x * \theta_1 \\
k_{-2} &= ... = k_{-i} = k_{des} \\
k_2 &= ... = k_i = k_{ads} \\
\theta_i &= x^{i-1} * \theta_1 \\
\theta_1 &= y * \theta_0 \\
\theta_i &= x^{i-1} * y * \theta_0 \\
C &= \frac{y}{x} \\
\theta_i &= C * x^i * \theta_0
\end{aligned}
\tag{1}
$$

$$
\begin{aligned}
q &= \frac{V_{ads}}{A} \\
q &= \frac{V_0 * \sum_{i=0}^{+\infty} i * \theta_i}{\sum_{i=0}^{+\infty} \theta_i} \\
\frac{q}{V_0} &= \frac{0 * \theta_0 + \sum_{i=1}^{+\infty} i * \theta_i}{\theta_0 + \sum_{i=1}^{+\infty} \theta_i} \\
\frac{q}{V_0} &= \frac{0 * \theta_0 + \sum_{i=1}^{+\infty} i * C * x^i * \theta_0}{\theta_0 + \sum_{i=1}^{+\infty} C * x^i * \theta_0} \\
\frac{q}{V_0} &= \frac{C * \theta_0 * \sum_{i=1}^{+\infty} i * x^i}{\theta_0 * (1 + C * \sum_{i=1}^{+\infty} x^i} \\
\frac{q}{V_0} &= \frac{C * \sum_{i=1}^{+\infty} i * x^i}{(1 + C * \sum_{i=1}^{+\infty} x^i)} \\
\sum_{i=1}^{+\infty} x_i &= \frac{x}{(1-x)} \\
\sum_{i=1}^{+\infty} i x_i &= \frac{x}{(1-x)^2} \\
\frac{q}{V_0} &= \frac{\frac{C*x}{(1-x)^2}}{1 + \frac{C*x}{(1-x)}} \\
\frac{q}{V_0} &= \frac{\frac{C*x}{(1-x)^2}}{\frac{1-x+c*x}{1-x}} \\
\frac{q}{V_0} &= \frac{C * x}{(1-x)(1-x+C*x)} \\
x &= \frac{k_{ads}}{k_{des}} * P \\
C &= \frac{y}{x} = \frac{\frac{k_1}{k_{-1}}}{\frac{k_{ads}}{k_{des}}} \\
\frac{q}{V_0} &= \frac{\frac{k_1}{k_{-1}} * P}{(1 - \frac{k_{ads}}{k_{des}} * P)(1 - \frac{k_a ds}{k_d es} * P + \frac{k_1}{k_{-1}} * P)} \\
q &= \frac{\frac{k_1}{k_{-1}} * V_0 * P}{(1 - \frac{k_{ads}}{k_{des}} * P)(1 - \frac{k_a ds}{k_d es} * P + \frac{k_1}{k_{-1}} * P)} \\
a &= \frac{k_1}{k_{-1}} * V_0 \\
b &= \frac{k_{ads}}{k_{des}} \\
q &= \frac{a * P}{(1 - b * P)(1 - b * P + C * P)}
\end{aligned}
\tag{2}
$$

Type of Variables:
A & V_{ads} & q & θ & θ_0 & V_0 & P & k_1 & k_{-1} & k_{ads} & k_{des} & k_2 & k_{-2} *are real numbers*
i : *natural number*
Constraints:
$\theta \geq 0$ & $\theta \leq 1$ & $k_{ads} > 0$ & $k_{des} > 0$ & $k_1 > 0$ & $k_{-1} > 0$ & $k_2 > 0$ & $k_{-2} >$
0 & $V_0 > 0$ & $P \geq 0$