

Function Definitions

$$\phi(X, k_X, v_X) = \frac{\binom{X^2}{\frac{v_X}{2}}}{\binom{(k_X^2)\left(\frac{v_X}{2}\right) + (X^2)\left(\frac{v_X}{2}\right)}{}} \\ \psi(X, k_X, v_X) = 1 - \phi(X, k_X, v_X)$$

Assignment Rules

$$\text{EWG}_{n(0,j)}^{\text{tot}} = [\text{EWG}_{0,3}] \\ + [\text{EWG}_{1,4}] \\ + [\text{EWG}_{1,5}] \\ + [\text{EWG}_{0,0}] \\ + [\text{EWG}_{3,1}] \\ + [\text{EWG}_{3,2}]$$

$$\text{EWG}_0^{\text{tot}} = [\text{EWG}_{0,0}] \\ + [\text{EWG}_{0,1}] \\ + [\text{EWG}_{0,2}] \\ + [\text{EWG}_{0,3}] \\ + [\text{EWG}_{0,4}] \\ + [\text{EWG}_{0,5}]$$

$$\text{PTC}_0^{\text{tot}} = [\text{PTC}_{0,0}] \\ + [\text{PTC}_{0,1}] \\ + [\text{PTC}_{0,2}] \\ + [\text{PTC}_{0,3}] \\ + [\text{PTC}_{0,4}] \\ + [\text{PTC}_{0,5}]$$

$$\text{EWG}_{n(1,j)}^{\text{tot}} = [\text{EWG}_{1,3}] \\ + [\text{EWG}_{2,4}] \\ + [\text{EWG}_{2,5}] \\ + [\text{EWG}_{1,0}] \\ + [\text{EWG}_{0,1}] \\ + [\text{EWG}_{0,2}]$$

$$\text{EWG}_1^{\text{tot}} = [\text{EWG}_{1,0}] \\ + [\text{EWG}_{1,1}] \\ + [\text{EWG}_{1,2}] \\ + [\text{EWG}_{1,3}] \\ + [\text{EWG}_{1,4}] \\ + [\text{EWG}_{1,5}]$$

$$\text{PTC}_1^{\text{tot}} = [\text{PTC}_{1,0}]$$

$$\begin{aligned}
& + [\text{PTC}_{1,1}] \\
& + [\text{PTC}_{1,2}] \\
& + [\text{PTC}_{1,3}] \\
& + [\text{PTC}_{1,4}] \\
& + [\text{PTC}_{1,5}] \\
\text{EWG}_{n(2,j)}^{\text{tot}} &= [\text{EWG}_{2,3}] \\
& + [\text{EWG}_{3,4}] \\
& + [\text{EWG}_{3,5}] \\
& + [\text{EWG}_{2,0}] \\
& + [\text{EWG}_{1,1}] \\
& + [\text{EWG}_{1,2}] \\
\text{EWG}_2^{\text{tot}} &= [\text{EWG}_{2,0}] \\
& + [\text{EWG}_{2,1}] \\
& + [\text{EWG}_{2,2}] \\
& + [\text{EWG}_{2,3}] \\
& + [\text{EWG}_{2,4}] \\
& + [\text{EWG}_{2,5}] \\
\text{PTC}_2^{\text{tot}} &= [\text{PTC}_{2,0}] \\
& + [\text{PTC}_{2,1}] \\
& + [\text{PTC}_{2,2}] \\
& + [\text{PTC}_{2,3}] \\
& + [\text{PTC}_{2,4}] \\
& + [\text{PTC}_{2,5}] \\
\text{EWG}_{n(3,j)}^{\text{tot}} &= [\text{EWG}_{3,3}] \\
& + [\text{EWG}_{0,4}] \\
& + [\text{EWG}_{0,5}] \\
& + [\text{EWG}_{3,0}] \\
& + [\text{EWG}_{2,1}] \\
& + [\text{EWG}_{2,2}] \\
\text{EWG}_3^{\text{tot}} &= [\text{EWG}_{3,0}] \\
& + [\text{EWG}_{3,1}] \\
& + [\text{EWG}_{3,2}] \\
& + [\text{EWG}_{3,3}] \\
& + [\text{EWG}_{3,4}] \\
& + [\text{EWG}_{3,5}] \\
\text{PTC}_3^{\text{tot}} &= [\text{PTC}_{3,0}] \\
& + [\text{PTC}_{3,1}] \\
& + [\text{PTC}_{3,2}] \\
& + [\text{PTC}_{3,3}] \\
& + [\text{PTC}_{3,4}] \\
& + [\text{PTC}_{3,5}]
\end{aligned}$$

Differential Equations

$$\begin{aligned}
\frac{d[\text{en}_0]}{dt} &= \frac{T_0 \cdot (\phi(\text{EWG}_{n(0,j)}^{\text{tot}} \cdot \psi([\text{CN}_0], \kappa_{\text{CNen}}, \nu_{\text{CNen}}, \kappa_{\text{WGen}}, \nu_{\text{WGen}})) - [\text{en}_0])}{H_{\text{en}}} \\
\frac{d[\text{en}_1]}{dt} &= \frac{T_0 \cdot (\phi(\text{EWG}_{n(1,j)}^{\text{tot}} \cdot \psi([\text{CN}_1], \kappa_{\text{CNen}}, \nu_{\text{CNen}}, \kappa_{\text{WGen}}, \nu_{\text{WGen}})) - [\text{en}_1])}{H_{\text{en}}} \\
\frac{d[\text{en}_2]}{dt} &= \frac{T_0 \cdot (\phi(\text{EWG}_{n(2,j)}^{\text{tot}} \cdot \psi([\text{CN}_2], \kappa_{\text{CNen}}, \nu_{\text{CNen}}, \kappa_{\text{WGen}}, \nu_{\text{WGen}})) - [\text{en}_2])}{H_{\text{en}}} \\
\frac{d[\text{en}_3]}{dt} &= \frac{T_0 \cdot (\phi(\text{EWG}_{n(3,j)}^{\text{tot}} \cdot \psi([\text{CN}_3], \kappa_{\text{CNen}}, \nu_{\text{CNen}}, \kappa_{\text{WGen}}, \nu_{\text{WGen}})) - [\text{en}_3])}{H_{\text{en}}} \\
\frac{d[\text{EN}_0]}{dt} &= \frac{T_0 \cdot ([\text{en}_0] - [\text{EN}_0])}{H_{\text{EN}}} \\
\frac{d[\text{EN}_1]}{dt} &= \frac{T_0 \cdot ([\text{en}_1] - [\text{EN}_1])}{H_{\text{EN}}} \\
\frac{d[\text{EN}_2]}{dt} &= \frac{T_0 \cdot ([\text{en}_2] - [\text{EN}_2])}{H_{\text{EN}}} \\
\frac{d[\text{EN}_3]}{dt} &= \frac{T_0 \cdot ([\text{en}_3] - [\text{EN}_3])}{H_{\text{EN}}} \\
\frac{d[\text{wg}_0]}{dt} &= \frac{T_0 \cdot (\text{beta}_{\text{wg}} \cdot \phi([\text{CID}_0] \cdot \psi([\text{CN}_0], \kappa_{\text{CNwg}}, \nu_{\text{CNwg}}, \kappa_{\text{CIDwg}}, \nu_{\text{CIDwg}})) + \alpha_{\text{wg}} \cdot \phi([\text{IWG}_0], \kappa_{\text{WGwg}}, \nu_{\text{WGwg}}))}{H_{\text{wg}} \cdot (1 + \text{beta}_{\text{wg}} \cdot \phi([\text{CID}_0] \cdot \psi([\text{CN}_0], \kappa_{\text{CNwg}}, \nu_{\text{CNwg}}, \kappa_{\text{CIDwg}}, \nu_{\text{CIDwg}})) + \alpha_{\text{wg}} \cdot \phi([\text{IWG}_0], \kappa_{\text{WGwg}}, \nu_{\text{WGwg}}))} \\
&\quad - \frac{T_0 \cdot [\text{wg}_0]}{H_{\text{wg}}} \\
\frac{d[\text{wg}_1]}{dt} &= \frac{T_0 \cdot (\text{beta}_{\text{wg}} \cdot \phi([\text{CID}_1] \cdot \psi([\text{CN}_1], \kappa_{\text{CNwg}}, \nu_{\text{CNwg}}, \kappa_{\text{CIDwg}}, \nu_{\text{CIDwg}})) + \alpha_{\text{wg}} \cdot \phi([\text{IWG}_1], \kappa_{\text{WGwg}}, \nu_{\text{WGwg}}))}{H_{\text{wg}} \cdot (1 + \text{beta}_{\text{wg}} \cdot \phi([\text{CID}_1] \cdot \psi([\text{CN}_1], \kappa_{\text{CNwg}}, \nu_{\text{CNwg}}, \kappa_{\text{CIDwg}}, \nu_{\text{CIDwg}})) + \alpha_{\text{wg}} \cdot \phi([\text{IWG}_1], \kappa_{\text{WGwg}}, \nu_{\text{WGwg}}))} \\
&\quad - \frac{T_0 \cdot [\text{wg}_1]}{H_{\text{wg}}} \\
\frac{d[\text{wg}_2]}{dt} &= \frac{T_0 \cdot (\text{beta}_{\text{wg}} \cdot \phi([\text{CID}_2] \cdot \psi([\text{CN}_2], \kappa_{\text{CNwg}}, \nu_{\text{CNwg}}, \kappa_{\text{CIDwg}}, \nu_{\text{CIDwg}})) + \alpha_{\text{wg}} \cdot \phi([\text{IWG}_2], \kappa_{\text{WGwg}}, \nu_{\text{WGwg}}))}{H_{\text{wg}} \cdot (1 + \text{beta}_{\text{wg}} \cdot \phi([\text{CID}_2] \cdot \psi([\text{CN}_2], \kappa_{\text{CNwg}}, \nu_{\text{CNwg}}, \kappa_{\text{CIDwg}}, \nu_{\text{CIDwg}})) + \alpha_{\text{wg}} \cdot \phi([\text{IWG}_2], \kappa_{\text{WGwg}}, \nu_{\text{WGwg}}))} \\
&\quad - \frac{T_0 \cdot [\text{wg}_2]}{H_{\text{wg}}} \\
\frac{d[\text{wg}_3]}{dt} &= \frac{T_0 \cdot (\text{beta}_{\text{wg}} \cdot \phi([\text{CID}_3] \cdot \psi([\text{CN}_3], \kappa_{\text{CNwg}}, \nu_{\text{CNwg}}, \kappa_{\text{CIDwg}}, \nu_{\text{CIDwg}})) + \alpha_{\text{wg}} \cdot \phi([\text{IWG}_3], \kappa_{\text{WGwg}}, \nu_{\text{WGwg}}))}{H_{\text{wg}} \cdot (1 + \text{beta}_{\text{wg}} \cdot \phi([\text{CID}_3] \cdot \psi([\text{CN}_3], \kappa_{\text{CNwg}}, \nu_{\text{CNwg}}, \kappa_{\text{CIDwg}}, \nu_{\text{CIDwg}})) + \alpha_{\text{wg}} \cdot \phi([\text{IWG}_3], \kappa_{\text{WGwg}}, \nu_{\text{WGwg}}))} \\
&\quad - \frac{T_0 \cdot [\text{wg}_3]}{H_{\text{wg}}} \\
\frac{d[\text{IWG}_0]}{dt} &= \frac{T_0 \cdot ([\text{wg}_0] - [\text{IWG}_0])}{H_{\text{IWG}}} \\
&\quad + T_0 \cdot (r_{\text{EndoWG}} \cdot \text{EWG}_0^{\text{tot}} - r_{\text{ExoWG}} \cdot [\text{IWG}_0]) \\
\frac{d[\text{IWG}_1]}{dt} &= \frac{T_0 \cdot ([\text{wg}_1] - [\text{IWG}_1])}{H_{\text{IWG}}} \\
&\quad + T_0 \cdot (r_{\text{EndoWG}} \cdot \text{EWG}_1^{\text{tot}} - r_{\text{ExoWG}} \cdot [\text{IWG}_1]) \\
\frac{d[\text{IWG}_2]}{dt} &= \frac{T_0 \cdot ([\text{wg}_2] - [\text{IWG}_2])}{H_{\text{IWG}}}
\end{aligned}$$

$$+ T_0 \cdot (r_{\text{EndoWG}} \cdot \text{EWG}_2^{\text{tot}} - r_{\text{ExoWG}} \cdot [\text{IWG}_2])$$

$$\begin{aligned} \frac{d[\text{IWG}_3]}{dt} &= \frac{T_0 \cdot ([\text{wg}_3] - [\text{IWG}_3])}{H_{\text{IWG}}} \\ &+ T_0 \cdot (r_{\text{EndoWG}} \cdot \text{EWG}_3^{\text{tot}} - r_{\text{ExoWG}} \cdot [\text{IWG}_3]) \end{aligned}$$

$$\begin{aligned} \frac{d[\text{EWG}_{0,0}]}{dt} &= \frac{T_0 \cdot r_{\text{ExoWG}} \cdot [\text{IWG}_0]}{6} \\ &+ - (T_0 \cdot r_{\text{EndoWG}} \cdot [\text{EWG}_{0,0}]) \\ &+ T_0 \cdot r_{\text{MxferWG}} \cdot ([\text{EWG}_{0,3}] - [\text{EWG}_{0,0}]) \\ &+ T_0 \cdot r_{\text{LMxferWG}} \cdot ([\text{EWG}_{0,5}] + [\text{EWG}_{0,1}] - 2 \cdot [\text{EWG}_{0,0}]) \\ &+ \frac{-T_0 \cdot [\text{EWG}_{0,0}]}{H_{\text{EWG}}} \end{aligned}$$

$$\begin{aligned} \frac{d[\text{EWG}_{0,1}]}{dt} &= \frac{T_0 \cdot r_{\text{ExoWG}} \cdot [\text{IWG}_0]}{6} \\ &+ - (T_0 \cdot r_{\text{EndoWG}} \cdot [\text{EWG}_{0,1}]) \\ &+ T_0 \cdot r_{\text{MxferWG}} \cdot ([\text{EWG}_{1,4}] - [\text{EWG}_{0,1}]) \\ &+ T_0 \cdot r_{\text{LMxferWG}} \cdot ([\text{EWG}_{0,0}] + [\text{EWG}_{0,2}] - 2 \cdot [\text{EWG}_{0,1}]) \\ &+ \frac{-T_0 \cdot [\text{EWG}_{0,1}]}{H_{\text{EWG}}} \end{aligned}$$

$$\begin{aligned} \frac{d[\text{EWG}_{0,2}]}{dt} &= \frac{T_0 \cdot r_{\text{ExoWG}} \cdot [\text{IWG}_0]}{6} \\ &+ - (T_0 \cdot r_{\text{EndoWG}} \cdot [\text{EWG}_{0,2}]) \\ &+ T_0 \cdot r_{\text{MxferWG}} \cdot ([\text{EWG}_{1,5}] - [\text{EWG}_{0,2}]) \\ &+ T_0 \cdot r_{\text{LMxferWG}} \cdot ([\text{EWG}_{0,1}] + [\text{EWG}_{0,3}] - 2 \cdot [\text{EWG}_{0,2}]) \\ &+ \frac{-T_0 \cdot [\text{EWG}_{0,2}]}{H_{\text{EWG}}} \end{aligned}$$

$$\begin{aligned} \frac{d[\text{EWG}_{0,3}]}{dt} &= \frac{T_0 \cdot r_{\text{ExoWG}} \cdot [\text{IWG}_0]}{6} \\ &+ - (T_0 \cdot r_{\text{EndoWG}} \cdot [\text{EWG}_{0,3}]) \\ &+ T_0 \cdot r_{\text{MxferWG}} \cdot ([\text{EWG}_{0,0}] - [\text{EWG}_{0,3}]) \\ &+ T_0 \cdot r_{\text{LMxferWG}} \cdot ([\text{EWG}_{0,2}] + [\text{EWG}_{0,4}] - 2 \cdot [\text{EWG}_{0,3}]) \\ &+ \frac{-T_0 \cdot [\text{EWG}_{0,3}]}{H_{\text{EWG}}} \end{aligned}$$

$$\begin{aligned} \frac{d[\text{EWG}_{0,4}]}{dt} &= \frac{T_0 \cdot r_{\text{ExoWG}} \cdot [\text{IWG}_0]}{6} \\ &+ - (T_0 \cdot r_{\text{EndoWG}} \cdot [\text{EWG}_{0,4}]) \\ &+ T_0 \cdot r_{\text{MxferWG}} \cdot ([\text{EWG}_{3,1}] - [\text{EWG}_{0,4}]) \\ &+ T_0 \cdot r_{\text{LMxferWG}} \cdot ([\text{EWG}_{0,3}] + [\text{EWG}_{0,5}] - 2 \cdot [\text{EWG}_{0,4}]) \\ &+ \frac{-T_0 \cdot [\text{EWG}_{0,4}]}{H_{\text{EWG}}} \end{aligned}$$

$$\begin{aligned} \frac{d[\text{EWG}_{0,5}]}{dt} &= \frac{T_0 \cdot r_{\text{ExoWG}} \cdot [\text{IWG}_0]}{6} \\ &+ - (T_0 \cdot r_{\text{EndoWG}} \cdot [\text{EWG}_{0,5}]) \\ &+ T_0 \cdot r_{\text{MxferWG}} \cdot ([\text{EWG}_{3,2}] - [\text{EWG}_{0,5}]) \\ &+ T_0 \cdot r_{\text{LMxferWG}} \cdot ([\text{EWG}_{0,4}] + [\text{EWG}_{0,0}] - 2 \cdot [\text{EWG}_{0,5}]) \\ &+ \frac{-T_0 \cdot [\text{EWG}_{0,5}]}{H_{\text{EWG}}} \end{aligned}$$

$$\frac{d[\text{EWG}_{1,0}]}{dt} = \frac{T_0 \cdot r_{\text{ExoWG}} \cdot [\text{IWG}_1]}{6}$$

$$\begin{aligned}
& + - (T_0 \cdot r_{\text{EndoWG}} \cdot [\text{EWG}_{1,0}]) \\
& + T_0 \cdot r_{\text{MxferWG}} \cdot ([\text{EWG}_{1,3}] - [\text{EWG}_{1,0}]) \\
& + T_0 \cdot r_{\text{LMxferWG}} \cdot ([\text{EWG}_{1,5}] + [\text{EWG}_{1,1}] - 2 \cdot [\text{EWG}_{1,0}]) \\
& + \frac{-T_0 \cdot [\text{EWG}_{1,0}]}{H_{\text{EWG}}}
\end{aligned}$$

$$\begin{aligned}
\frac{d[\text{EWG}_{1,1}]}{dt} &= \frac{T_0 \cdot r_{\text{ExoWG}} \cdot [\text{IWG}_1]}{6} \\
& + - (T_0 \cdot r_{\text{EndoWG}} \cdot [\text{EWG}_{1,1}]) \\
& + T_0 \cdot r_{\text{MxferWG}} \cdot ([\text{EWG}_{2,4}] - [\text{EWG}_{1,1}]) \\
& + T_0 \cdot r_{\text{LMxferWG}} \cdot ([\text{EWG}_{1,0}] + [\text{EWG}_{1,2}] - 2 \cdot [\text{EWG}_{1,1}]) \\
& + \frac{-T_0 \cdot [\text{EWG}_{1,1}]}{H_{\text{EWG}}}
\end{aligned}$$

$$\begin{aligned}
\frac{d[\text{EWG}_{1,2}]}{dt} &= \frac{T_0 \cdot r_{\text{ExoWG}} \cdot [\text{IWG}_1]}{6} \\
& + - (T_0 \cdot r_{\text{EndoWG}} \cdot [\text{EWG}_{1,2}]) \\
& + T_0 \cdot r_{\text{MxferWG}} \cdot ([\text{EWG}_{2,5}] - [\text{EWG}_{1,2}]) \\
& + T_0 \cdot r_{\text{LMxferWG}} \cdot ([\text{EWG}_{1,1}] + [\text{EWG}_{1,3}] - 2 \cdot [\text{EWG}_{1,2}]) \\
& + \frac{-T_0 \cdot [\text{EWG}_{1,2}]}{H_{\text{EWG}}}
\end{aligned}$$

$$\begin{aligned}
\frac{d[\text{EWG}_{1,3}]}{dt} &= \frac{T_0 \cdot r_{\text{ExoWG}} \cdot [\text{IWG}_1]}{6} \\
& + - (T_0 \cdot r_{\text{EndoWG}} \cdot [\text{EWG}_{1,3}]) \\
& + T_0 \cdot r_{\text{MxferWG}} \cdot ([\text{EWG}_{1,0}] - [\text{EWG}_{1,3}]) \\
& + T_0 \cdot r_{\text{LMxferWG}} \cdot ([\text{EWG}_{1,2}] + [\text{EWG}_{1,4}] - 2 \cdot [\text{EWG}_{1,3}]) \\
& + \frac{-T_0 \cdot [\text{EWG}_{1,3}]}{H_{\text{EWG}}}
\end{aligned}$$

$$\begin{aligned}
\frac{d[\text{EWG}_{1,4}]}{dt} &= \frac{T_0 \cdot r_{\text{ExoWG}} \cdot [\text{IWG}_1]}{6} \\
& + - (T_0 \cdot r_{\text{EndoWG}} \cdot [\text{EWG}_{1,4}]) \\
& + T_0 \cdot r_{\text{MxferWG}} \cdot ([\text{EWG}_{0,1}] - [\text{EWG}_{1,4}]) \\
& + T_0 \cdot r_{\text{LMxferWG}} \cdot ([\text{EWG}_{1,3}] + [\text{EWG}_{1,5}] - 2 \cdot [\text{EWG}_{1,4}]) \\
& + \frac{-T_0 \cdot [\text{EWG}_{1,4}]}{H_{\text{EWG}}}
\end{aligned}$$

$$\begin{aligned}
\frac{d[\text{EWG}_{1,5}]}{dt} &= \frac{T_0 \cdot r_{\text{ExoWG}} \cdot [\text{IWG}_1]}{6} \\
& + - (T_0 \cdot r_{\text{EndoWG}} \cdot [\text{EWG}_{1,5}]) \\
& + T_0 \cdot r_{\text{MxferWG}} \cdot ([\text{EWG}_{0,2}] - [\text{EWG}_{1,5}]) \\
& + T_0 \cdot r_{\text{LMxferWG}} \cdot ([\text{EWG}_{1,4}] + [\text{EWG}_{1,0}] - 2 \cdot [\text{EWG}_{1,5}]) \\
& + \frac{-T_0 \cdot [\text{EWG}_{1,5}]}{H_{\text{EWG}}}
\end{aligned}$$

$$\begin{aligned}
\frac{d[\text{EWG}_{2,0}]}{dt} &= \frac{T_0 \cdot r_{\text{ExoWG}} \cdot [\text{IWG}_2]}{6} \\
& + - (T_0 \cdot r_{\text{EndoWG}} \cdot [\text{EWG}_{2,0}]) \\
& + T_0 \cdot r_{\text{MxferWG}} \cdot ([\text{EWG}_{2,3}] - [\text{EWG}_{2,0}]) \\
& + T_0 \cdot r_{\text{LMxferWG}} \cdot ([\text{EWG}_{2,5}] + [\text{EWG}_{2,1}] - 2 \cdot [\text{EWG}_{2,0}]) \\
& + \frac{-T_0 \cdot [\text{EWG}_{2,0}]}{H_{\text{EWG}}}
\end{aligned}$$

$$\begin{aligned}
\frac{d[\text{EWG}_{2,1}]}{dt} &= \frac{T_0 \cdot r_{\text{ExoWG}} \cdot [\text{IWG}_2]}{6} \\
& + - (T_0 \cdot r_{\text{EndoWG}} \cdot [\text{EWG}_{2,1}])
\end{aligned}$$

$$\begin{aligned}
& + T_0 \cdot r_{\text{MxferWG}} \cdot ([\text{EWG}_{3,4}] - [\text{EWG}_{2,1}]) \\
& + T_0 \cdot r_{\text{LMxferWG}} \cdot ([\text{EWG}_{2,0}] + [\text{EWG}_{2,2}] - 2 \cdot [\text{EWG}_{2,1}]) \\
& + \frac{-T_0 \cdot [\text{EWG}_{2,1}]}{H_{\text{EWG}}}
\end{aligned}$$

$$\begin{aligned}
\frac{d[\text{EWG}_{2,2}]}{dt} &= \frac{T_0 \cdot r_{\text{ExoWG}} \cdot [\text{IWG}_2]}{6} \\
& + - (T_0 \cdot r_{\text{EndoWG}} \cdot [\text{EWG}_{2,2}]) \\
& + T_0 \cdot r_{\text{MxferWG}} \cdot ([\text{EWG}_{3,5}] - [\text{EWG}_{2,2}]) \\
& + T_0 \cdot r_{\text{LMxferWG}} \cdot ([\text{EWG}_{2,1}] + [\text{EWG}_{2,3}] - 2 \cdot [\text{EWG}_{2,2}]) \\
& + \frac{-T_0 \cdot [\text{EWG}_{2,2}]}{H_{\text{EWG}}}
\end{aligned}$$

$$\begin{aligned}
\frac{d[\text{EWG}_{2,3}]}{dt} &= \frac{T_0 \cdot r_{\text{ExoWG}} \cdot [\text{IWG}_2]}{6} \\
& + - (T_0 \cdot r_{\text{EndoWG}} \cdot [\text{EWG}_{2,3}]) \\
& + T_0 \cdot r_{\text{MxferWG}} \cdot ([\text{EWG}_{2,0}] - [\text{EWG}_{2,3}]) \\
& + T_0 \cdot r_{\text{LMxferWG}} \cdot ([\text{EWG}_{2,2}] + [\text{EWG}_{2,4}] - 2 \cdot [\text{EWG}_{2,3}]) \\
& + \frac{-T_0 \cdot [\text{EWG}_{2,3}]}{H_{\text{EWG}}}
\end{aligned}$$

$$\begin{aligned}
\frac{d[\text{EWG}_{2,4}]}{dt} &= \frac{T_0 \cdot r_{\text{ExoWG}} \cdot [\text{IWG}_2]}{6} \\
& + - (T_0 \cdot r_{\text{EndoWG}} \cdot [\text{EWG}_{2,4}]) \\
& + T_0 \cdot r_{\text{MxferWG}} \cdot ([\text{EWG}_{1,1}] - [\text{EWG}_{2,4}]) \\
& + T_0 \cdot r_{\text{LMxferWG}} \cdot ([\text{EWG}_{2,3}] + [\text{EWG}_{2,5}] - 2 \cdot [\text{EWG}_{2,4}]) \\
& + \frac{-T_0 \cdot [\text{EWG}_{2,4}]}{H_{\text{EWG}}}
\end{aligned}$$

$$\begin{aligned}
\frac{d[\text{EWG}_{2,5}]}{dt} &= \frac{T_0 \cdot r_{\text{ExoWG}} \cdot [\text{IWG}_2]}{6} \\
& + - (T_0 \cdot r_{\text{EndoWG}} \cdot [\text{EWG}_{2,5}]) \\
& + T_0 \cdot r_{\text{MxferWG}} \cdot ([\text{EWG}_{1,2}] - [\text{EWG}_{2,5}]) \\
& + T_0 \cdot r_{\text{LMxferWG}} \cdot ([\text{EWG}_{2,4}] + [\text{EWG}_{2,0}] - 2 \cdot [\text{EWG}_{2,5}]) \\
& + \frac{-T_0 \cdot [\text{EWG}_{2,5}]}{H_{\text{EWG}}}
\end{aligned}$$

$$\begin{aligned}
\frac{d[\text{EWG}_{3,0}]}{dt} &= \frac{T_0 \cdot r_{\text{ExoWG}} \cdot [\text{IWG}_3]}{6} \\
& + - (T_0 \cdot r_{\text{EndoWG}} \cdot [\text{EWG}_{3,0}]) \\
& + T_0 \cdot r_{\text{MxferWG}} \cdot ([\text{EWG}_{3,3}] - [\text{EWG}_{3,0}]) \\
& + T_0 \cdot r_{\text{LMxferWG}} \cdot ([\text{EWG}_{3,5}] + [\text{EWG}_{3,1}] - 2 \cdot [\text{EWG}_{3,0}]) \\
& + \frac{-T_0 \cdot [\text{EWG}_{3,0}]}{H_{\text{EWG}}}
\end{aligned}$$

$$\begin{aligned}
\frac{d[\text{EWG}_{3,1}]}{dt} &= \frac{T_0 \cdot r_{\text{ExoWG}} \cdot [\text{IWG}_3]}{6} \\
& + - (T_0 \cdot r_{\text{EndoWG}} \cdot [\text{EWG}_{3,1}]) \\
& + T_0 \cdot r_{\text{MxferWG}} \cdot ([\text{EWG}_{0,4}] - [\text{EWG}_{3,1}]) \\
& + T_0 \cdot r_{\text{LMxferWG}} \cdot ([\text{EWG}_{3,0}] + [\text{EWG}_{3,2}] - 2 \cdot [\text{EWG}_{3,1}]) \\
& + \frac{-T_0 \cdot [\text{EWG}_{3,1}]}{H_{\text{EWG}}}
\end{aligned}$$

$$\begin{aligned}
\frac{d[\text{EWG}_{3,2}]}{dt} &= \frac{T_0 \cdot r_{\text{ExoWG}} \cdot [\text{IWG}_3]}{6} \\
& + - (T_0 \cdot r_{\text{EndoWG}} \cdot [\text{EWG}_{3,2}]) \\
& + T_0 \cdot r_{\text{MxferWG}} \cdot ([\text{EWG}_{0,5}] - [\text{EWG}_{3,2}])
\end{aligned}$$

$$\begin{aligned}
& + T_0 \cdot r_{LMxferWG} \cdot ([EWG_{3,1}] + [EWG_{3,3}] - 2 \cdot [EWG_{3,2}]) \\
& + \frac{-T_0 \cdot [EWG_{3,2}]}{H_{EWG}} \\
\frac{d [EWG_{3,3}]}{dt} & = \frac{T_0 \cdot r_{ExoWG} \cdot [IWG_3]}{6} \\
& + - (T_0 \cdot r_{EndoWG} \cdot [EWG_{3,3}]) \\
& + T_0 \cdot r_{MxferWG} \cdot ([EWG_{3,0}] - [EWG_{3,3}]) \\
& + T_0 \cdot r_{LMxferWG} \cdot ([EWG_{3,2}] + [EWG_{3,4}] - 2 \cdot [EWG_{3,3}]) \\
& + \frac{-T_0 \cdot [EWG_{3,3}]}{H_{EWG}} \\
\frac{d [EWG_{3,4}]}{dt} & = \frac{T_0 \cdot r_{ExoWG} \cdot [IWG_3]}{6} \\
& + - (T_0 \cdot r_{EndoWG} \cdot [EWG_{3,4}]) \\
& + T_0 \cdot r_{MxferWG} \cdot ([EWG_{2,1}] - [EWG_{3,4}]) \\
& + T_0 \cdot r_{LMxferWG} \cdot ([EWG_{3,3}] + [EWG_{3,5}] - 2 \cdot [EWG_{3,4}]) \\
& + \frac{-T_0 \cdot [EWG_{3,4}]}{H_{EWG}} \\
\frac{d [EWG_{3,5}]}{dt} & = \frac{T_0 \cdot r_{ExoWG} \cdot [IWG_3]}{6} \\
& + - (T_0 \cdot r_{EndoWG} \cdot [EWG_{3,5}]) \\
& + T_0 \cdot r_{MxferWG} \cdot ([EWG_{2,2}] - [EWG_{3,5}]) \\
& + T_0 \cdot r_{LMxferWG} \cdot ([EWG_{3,4}] + [EWG_{3,0}] - 2 \cdot [EWG_{3,5}]) \\
& + \frac{-T_0 \cdot [EWG_{3,5}]}{H_{EWG}} \\
\frac{d [ptc_0]}{dt} & = \frac{T_0 \cdot (\phi([CID_0] \cdot \psi([CN_0], \kappa_{CNptc}, \nu_{CNptc}), \kappa_{CIDptc}, \nu_{CIDptc}) - [ptc_0])}{H_{ptc}} \\
\frac{d [ptc_1]}{dt} & = \frac{T_0 \cdot (\phi([CID_1] \cdot \psi([CN_1], \kappa_{CNptc}, \nu_{CNptc}), \kappa_{CIDptc}, \nu_{CIDptc}) - [ptc_1])}{H_{ptc}} \\
\frac{d [ptc_2]}{dt} & = \frac{T_0 \cdot (\phi([CID_2] \cdot \psi([CN_2], \kappa_{CNptc}, \nu_{CNptc}), \kappa_{CIDptc}, \nu_{CIDptc}) - [ptc_2])}{H_{ptc}} \\
\frac{d [ptc_3]}{dt} & = \frac{T_0 \cdot (\phi([CID_3] \cdot \psi([CN_3], \kappa_{CNptc}, \nu_{CNptc}), \kappa_{CIDptc}, \nu_{CIDptc}) - [ptc_3])}{H_{ptc}} \\
\frac{d [PTC_{0,0}]}{dt} & = \frac{T_0 \cdot \left(\frac{[ptc_0]}{6} - [PTC_{0,0}] \right)}{H_{PTC}} \\
& + - (T_0 \cdot k_{PTCHH} \cdot [HH]_0 \cdot [HH_{0,3}] \cdot [PTC_{0,0}]) \\
& + T_0 \cdot r_{LMxferPTC} \cdot ([PTC_{0,5}] + [PTC_{0,1}] - 2 \cdot [PTC_{0,0}]) \\
\frac{d [PTC_{0,1}]}{dt} & = \frac{T_0 \cdot \left(\frac{[ptc_0]}{6} - [PTC_{0,1}] \right)}{H_{PTC}} \\
& + - (T_0 \cdot k_{PTCHH} \cdot [HH]_0 \cdot [HH_{1,4}] \cdot [PTC_{0,1}]) \\
& + T_0 \cdot r_{LMxferPTC} \cdot ([PTC_{0,0}] + [PTC_{0,2}] - 2 \cdot [PTC_{0,1}]) \\
\frac{d [PTC_{0,2}]}{dt} & = \frac{T_0 \cdot \left(\frac{[ptc_0]}{6} - [PTC_{0,2}] \right)}{H_{PTC}}
\end{aligned}$$

$$\begin{aligned}
& + - (T_0 \cdot k_{PTCHH} \cdot [HH]_0 \cdot [HH_{1,5}] \cdot [PTC_{0,2}]) \\
& + T_0 \cdot r_{LMxferPTC} \cdot ([PTC_{0,1}] + [PTC_{0,3}] - 2 \cdot [PTC_{0,2}])
\end{aligned}$$

$$\begin{aligned}
\frac{d[PTC_{0,3}]}{dt} &= \frac{T_0 \cdot \left(\frac{[ptc_0]}{6} - [PTC_{0,3}] \right)}{H_{PTC}} \\
& + - (T_0 \cdot k_{PTCHH} \cdot [HH]_0 \cdot [HH_{0,0}] \cdot [PTC_{0,3}]) \\
& + T_0 \cdot r_{LMxferPTC} \cdot ([PTC_{0,2}] + [PTC_{0,4}] - 2 \cdot [PTC_{0,3}])
\end{aligned}$$

$$\begin{aligned}
\frac{d[PTC_{0,4}]}{dt} &= \frac{T_0 \cdot \left(\frac{[ptc_0]}{6} - [PTC_{0,4}] \right)}{H_{PTC}} \\
& + - (T_0 \cdot k_{PTCHH} \cdot [HH]_0 \cdot [HH_{3,1}] \cdot [PTC_{0,4}]) \\
& + T_0 \cdot r_{LMxferPTC} \cdot ([PTC_{0,3}] + [PTC_{0,5}] - 2 \cdot [PTC_{0,4}])
\end{aligned}$$

$$\begin{aligned}
\frac{d[PTC_{0,5}]}{dt} &= \frac{T_0 \cdot \left(\frac{[ptc_0]}{6} - [PTC_{0,5}] \right)}{H_{PTC}} \\
& + - (T_0 \cdot k_{PTCHH} \cdot [HH]_0 \cdot [HH_{3,2}] \cdot [PTC_{0,5}]) \\
& + T_0 \cdot r_{LMxferPTC} \cdot ([PTC_{0,4}] + [PTC_{0,0}] - 2 \cdot [PTC_{0,5}])
\end{aligned}$$

$$\begin{aligned}
\frac{d[PTC_{1,0}]}{dt} &= \frac{T_0 \cdot \left(\frac{[ptc_1]}{6} - [PTC_{1,0}] \right)}{H_{PTC}} \\
& + - (T_0 \cdot k_{PTCHH} \cdot [HH]_0 \cdot [HH_{1,3}] \cdot [PTC_{1,0}]) \\
& + T_0 \cdot r_{LMxferPTC} \cdot ([PTC_{1,5}] + [PTC_{1,1}] - 2 \cdot [PTC_{1,0}])
\end{aligned}$$

$$\begin{aligned}
\frac{d[PTC_{1,1}]}{dt} &= \frac{T_0 \cdot \left(\frac{[ptc_1]}{6} - [PTC_{1,1}] \right)}{H_{PTC}} \\
& + - (T_0 \cdot k_{PTCHH} \cdot [HH]_0 \cdot [HH_{2,4}] \cdot [PTC_{1,1}]) \\
& + T_0 \cdot r_{LMxferPTC} \cdot ([PTC_{1,0}] + [PTC_{1,2}] - 2 \cdot [PTC_{1,1}])
\end{aligned}$$

$$\begin{aligned}
\frac{d[PTC_{1,2}]}{dt} &= \frac{T_0 \cdot \left(\frac{[ptc_1]}{6} - [PTC_{1,2}] \right)}{H_{PTC}} \\
& + - (T_0 \cdot k_{PTCHH} \cdot [HH]_0 \cdot [HH_{2,5}] \cdot [PTC_{1,2}]) \\
& + T_0 \cdot r_{LMxferPTC} \cdot ([PTC_{1,1}] + [PTC_{1,3}] - 2 \cdot [PTC_{1,2}])
\end{aligned}$$

$$\begin{aligned}
\frac{d[PTC_{1,3}]}{dt} &= \frac{T_0 \cdot \left(\frac{[ptc_1]}{6} - [PTC_{1,3}] \right)}{H_{PTC}} \\
& + - (T_0 \cdot k_{PTCHH} \cdot [HH]_0 \cdot [HH_{1,0}] \cdot [PTC_{1,3}]) \\
& + T_0 \cdot r_{LMxferPTC} \cdot ([PTC_{1,2}] + [PTC_{1,4}] - 2 \cdot [PTC_{1,3}])
\end{aligned}$$

$$\begin{aligned}
\frac{d[PTC_{1,4}]}{dt} &= \frac{T_0 \cdot \left(\frac{[ptc_1]}{6} - [PTC_{1,4}] \right)}{H_{PTC}} \\
& + - (T_0 \cdot k_{PTCHH} \cdot [HH]_0 \cdot [HH_{0,1}] \cdot [PTC_{1,4}])
\end{aligned}$$

$$+ T_0 \cdot r_{LMxferPTC} \cdot ([PTC_{1,3}] + [PTC_{1,5}] - 2 \cdot [PTC_{1,4}])$$

$$\begin{aligned} \frac{d[PTC_{1,5}]}{dt} &= \frac{T_0 \cdot \left(\frac{[ptc1]}{6} - [PTC_{1,5}] \right)}{H_{PTC}} \\ &+ - (T_0 \cdot k_{PTCHH} \cdot [HH]_0 \cdot [HH_{0,2}] \cdot [PTC_{1,5}]) \\ &+ T_0 \cdot r_{LMxferPTC} \cdot ([PTC_{1,4}] + [PTC_{1,0}] - 2 \cdot [PTC_{1,5}]) \end{aligned}$$

$$\begin{aligned} \frac{d[PTC_{2,0}]}{dt} &= \frac{T_0 \cdot \left(\frac{[ptc2]}{6} - [PTC_{2,0}] \right)}{H_{PTC}} \\ &+ - (T_0 \cdot k_{PTCHH} \cdot [HH]_0 \cdot [HH_{2,3}] \cdot [PTC_{2,0}]) \\ &+ T_0 \cdot r_{LMxferPTC} \cdot ([PTC_{2,5}] + [PTC_{2,1}] - 2 \cdot [PTC_{2,0}]) \end{aligned}$$

$$\begin{aligned} \frac{d[PTC_{2,1}]}{dt} &= \frac{T_0 \cdot \left(\frac{[ptc2]}{6} - [PTC_{2,1}] \right)}{H_{PTC}} \\ &+ - (T_0 \cdot k_{PTCHH} \cdot [HH]_0 \cdot [HH_{3,4}] \cdot [PTC_{2,1}]) \\ &+ T_0 \cdot r_{LMxferPTC} \cdot ([PTC_{2,0}] + [PTC_{2,2}] - 2 \cdot [PTC_{2,1}]) \end{aligned}$$

$$\begin{aligned} \frac{d[PTC_{2,2}]}{dt} &= \frac{T_0 \cdot \left(\frac{[ptc2]}{6} - [PTC_{2,2}] \right)}{H_{PTC}} \\ &+ - (T_0 \cdot k_{PTCHH} \cdot [HH]_0 \cdot [HH_{3,5}] \cdot [PTC_{2,2}]) \\ &+ T_0 \cdot r_{LMxferPTC} \cdot ([PTC_{2,1}] + [PTC_{2,3}] - 2 \cdot [PTC_{2,2}]) \end{aligned}$$

$$\begin{aligned} \frac{d[PTC_{2,3}]}{dt} &= \frac{T_0 \cdot \left(\frac{[ptc2]}{6} - [PTC_{2,3}] \right)}{H_{PTC}} \\ &+ - (T_0 \cdot k_{PTCHH} \cdot [HH]_0 \cdot [HH_{2,0}] \cdot [PTC_{2,3}]) \\ &+ T_0 \cdot r_{LMxferPTC} \cdot ([PTC_{2,2}] + [PTC_{2,4}] - 2 \cdot [PTC_{2,3}]) \end{aligned}$$

$$\begin{aligned} \frac{d[PTC_{2,4}]}{dt} &= \frac{T_0 \cdot \left(\frac{[ptc2]}{6} - [PTC_{2,4}] \right)}{H_{PTC}} \\ &+ - (T_0 \cdot k_{PTCHH} \cdot [HH]_0 \cdot [HH_{1,1}] \cdot [PTC_{2,4}]) \\ &+ T_0 \cdot r_{LMxferPTC} \cdot ([PTC_{2,3}] + [PTC_{2,5}] - 2 \cdot [PTC_{2,4}]) \end{aligned}$$

$$\begin{aligned} \frac{d[PTC_{2,5}]}{dt} &= \frac{T_0 \cdot \left(\frac{[ptc2]}{6} - [PTC_{2,5}] \right)}{H_{PTC}} \\ &+ - (T_0 \cdot k_{PTCHH} \cdot [HH]_0 \cdot [HH_{1,2}] \cdot [PTC_{2,5}]) \\ &+ T_0 \cdot r_{LMxferPTC} \cdot ([PTC_{2,4}] + [PTC_{2,0}] - 2 \cdot [PTC_{2,5}]) \end{aligned}$$

$$\begin{aligned} \frac{d[PTC_{3,0}]}{dt} &= \frac{T_0 \cdot \left(\frac{[ptc3]}{6} - [PTC_{3,0}] \right)}{H_{PTC}} \\ &+ - (T_0 \cdot k_{PTCHH} \cdot [HH]_0 \cdot [HH_{3,3}] \cdot [PTC_{3,0}]) \\ &+ T_0 \cdot r_{LMxferPTC} \cdot ([PTC_{3,5}] + [PTC_{3,1}] - 2 \cdot [PTC_{3,0}]) \end{aligned}$$

$$\begin{aligned} \frac{d[\text{PTC}_{3,1}]}{dt} &= \frac{T_0 \cdot \left(\frac{[\text{ptc}_3]}{6} - [\text{PTC}_{3,1}] \right)}{H_{\text{PTC}}} \\ &+ - (T_0 \cdot k_{\text{PTCHH}} \cdot [\text{HH}]_0 \cdot [\text{HH}_{0,4}] \cdot [\text{PTC}_{3,1}]) \\ &+ T_0 \cdot r_{\text{LMxferPTC}} \cdot ([\text{PTC}_{3,0}] + [\text{PTC}_{3,2}] - 2 \cdot [\text{PTC}_{3,1}]) \end{aligned}$$

$$\begin{aligned} \frac{d[\text{PTC}_{3,2}]}{dt} &= \frac{T_0 \cdot \left(\frac{[\text{ptc}_3]}{6} - [\text{PTC}_{3,2}] \right)}{H_{\text{PTC}}} \\ &+ - (T_0 \cdot k_{\text{PTCHH}} \cdot [\text{HH}]_0 \cdot [\text{HH}_{0,5}] \cdot [\text{PTC}_{3,2}]) \\ &+ T_0 \cdot r_{\text{LMxferPTC}} \cdot ([\text{PTC}_{3,1}] + [\text{PTC}_{3,3}] - 2 \cdot [\text{PTC}_{3,2}]) \end{aligned}$$

$$\begin{aligned} \frac{d[\text{PTC}_{3,3}]}{dt} &= \frac{T_0 \cdot \left(\frac{[\text{ptc}_3]}{6} - [\text{PTC}_{3,3}] \right)}{H_{\text{PTC}}} \\ &+ - (T_0 \cdot k_{\text{PTCHH}} \cdot [\text{HH}]_0 \cdot [\text{HH}_{3,0}] \cdot [\text{PTC}_{3,3}]) \\ &+ T_0 \cdot r_{\text{LMxferPTC}} \cdot ([\text{PTC}_{3,2}] + [\text{PTC}_{3,4}] - 2 \cdot [\text{PTC}_{3,3}]) \end{aligned}$$

$$\begin{aligned} \frac{d[\text{PTC}_{3,4}]}{dt} &= \frac{T_0 \cdot \left(\frac{[\text{ptc}_3]}{6} - [\text{PTC}_{3,4}] \right)}{H_{\text{PTC}}} \\ &+ - (T_0 \cdot k_{\text{PTCHH}} \cdot [\text{HH}]_0 \cdot [\text{HH}_{2,1}] \cdot [\text{PTC}_{3,4}]) \\ &+ T_0 \cdot r_{\text{LMxferPTC}} \cdot ([\text{PTC}_{3,3}] + [\text{PTC}_{3,5}] - 2 \cdot [\text{PTC}_{3,4}]) \end{aligned}$$

$$\begin{aligned} \frac{d[\text{PTC}_{3,5}]}{dt} &= \frac{T_0 \cdot \left(\frac{[\text{ptc}_3]}{6} - [\text{PTC}_{3,5}] \right)}{H_{\text{PTC}}} \\ &+ - (T_0 \cdot k_{\text{PTCHH}} \cdot [\text{HH}]_0 \cdot [\text{HH}_{2,2}] \cdot [\text{PTC}_{3,5}]) \\ &+ T_0 \cdot r_{\text{LMxferPTC}} \cdot ([\text{PTC}_{3,4}] + [\text{PTC}_{3,0}] - 2 \cdot [\text{PTC}_{3,5}]) \end{aligned}$$

$$\frac{d[\text{cid}_0]}{dt} = \frac{T_0 \cdot (\phi([\text{B}_0] \cdot \psi([\text{EN}_0], \kappa_{\text{ENcid}}, \nu_{\text{ENcid}}), \kappa_{\text{Bcid}}, \nu_{\text{Bcid}}) - [\text{cid}_0])}{H_{\text{cid}}}$$

$$\frac{d[\text{cid}_1]}{dt} = \frac{T_0 \cdot (\phi([\text{B}_1] \cdot \psi([\text{EN}_1], \kappa_{\text{ENcid}}, \nu_{\text{ENcid}}), \kappa_{\text{Bcid}}, \nu_{\text{Bcid}}) - [\text{cid}_1])}{H_{\text{cid}}}$$

$$\frac{d[\text{cid}_2]}{dt} = \frac{T_0 \cdot (\phi([\text{B}_2] \cdot \psi([\text{EN}_2], \kappa_{\text{ENcid}}, \nu_{\text{ENcid}}), \kappa_{\text{Bcid}}, \nu_{\text{Bcid}}) - [\text{cid}_2])}{H_{\text{cid}}}$$

$$\frac{d[\text{cid}_3]}{dt} = \frac{T_0 \cdot (\phi([\text{B}_3] \cdot \psi([\text{EN}_3], \kappa_{\text{ENcid}}, \nu_{\text{ENcid}}), \kappa_{\text{Bcid}}, \nu_{\text{Bcid}}) - [\text{cid}_3])}{H_{\text{cid}}}$$

$$\begin{aligned} \frac{d[\text{CID}_0]}{dt} &= \frac{T_0 \cdot ([\text{cid}_0] - [\text{CID}_0])}{H_{\text{CID}}} \\ &- T_0 \cdot C_{\text{CID}} \cdot [\text{CID}_0] \cdot \phi(\text{PTC}_0^{\text{tot}}, \kappa_{\text{PTCCID}}, \nu_{\text{PTCCID}}) \end{aligned}$$

$$\begin{aligned} \frac{d[\text{CID}_1]}{dt} &= \frac{T_0 \cdot ([\text{cid}_1] - [\text{CID}_1])}{H_{\text{CID}}} \\ &- T_0 \cdot C_{\text{CID}} \cdot [\text{CID}_1] \cdot \phi(\text{PTC}_1^{\text{tot}}, \kappa_{\text{PTCCID}}, \nu_{\text{PTCCID}}) \end{aligned}$$

$$\frac{d[\text{CID}_2]}{dt} = \frac{T_0 \cdot ([\text{cid}_2] - [\text{CID}_2])}{H_{\text{CID}}}$$

$$\begin{aligned}
& -T_0 \cdot C_{\text{CID}} \cdot [\text{CID}_2] \cdot \phi(\text{PTC}_2^{\text{tot}}, \kappa_{\text{PTCCID}}, \nu_{\text{PTCCID}}) \\
\frac{d[\text{CID}_3]}{dt} &= \frac{T_0 \cdot ([\text{cid}_3] - [\text{CID}_3])}{H_{\text{CID}}} \\
& -T_0 \cdot C_{\text{CID}} \cdot [\text{CID}_3] \cdot \phi(\text{PTC}_3^{\text{tot}}, \kappa_{\text{PTCCID}}, \nu_{\text{PTCCID}}) \\
\frac{d[\text{CN}_0]}{dt} &= T_0 \cdot C_{\text{CID}} \cdot [\text{CID}_0] \cdot \phi(\text{PTC}_0^{\text{tot}}, \kappa_{\text{PTCCID}}, \nu_{\text{PTCCID}}) \\
& - \frac{T_0 \cdot [\text{CN}_0]}{H_{\text{CN}}} \\
\frac{d[\text{CN}_1]}{dt} &= T_0 \cdot C_{\text{CID}} \cdot [\text{CID}_1] \cdot \phi(\text{PTC}_1^{\text{tot}}, \kappa_{\text{PTCCID}}, \nu_{\text{PTCCID}}) \\
& - \frac{T_0 \cdot [\text{CN}_1]}{H_{\text{CN}}} \\
\frac{d[\text{CN}_2]}{dt} &= T_0 \cdot C_{\text{CID}} \cdot [\text{CID}_2] \cdot \phi(\text{PTC}_2^{\text{tot}}, \kappa_{\text{PTCCID}}, \nu_{\text{PTCCID}}) \\
& - \frac{T_0 \cdot [\text{CN}_2]}{H_{\text{CN}}} \\
\frac{d[\text{CN}_3]}{dt} &= T_0 \cdot C_{\text{CID}} \cdot [\text{CID}_3] \cdot \phi(\text{PTC}_3^{\text{tot}}, \kappa_{\text{PTCCID}}, \nu_{\text{PTCCID}}) \\
& - \frac{T_0 \cdot [\text{CN}_3]}{H_{\text{CN}}} \\
\frac{d[\text{hh}_0]}{dt} &= \frac{T_0 \cdot (\phi([\text{EN}_0] \cdot \psi([\text{CN}_0], \kappa_{\text{CNhh}}, \nu_{\text{CNhh}}), \kappa_{\text{ENhh}}, \nu_{\text{ENhh}}) - [\text{hh}_0])}{H_{\text{hh}}} \\
\frac{d[\text{hh}_1]}{dt} &= \frac{T_0 \cdot (\phi([\text{EN}_1] \cdot \psi([\text{CN}_1], \kappa_{\text{CNhh}}, \nu_{\text{CNhh}}), \kappa_{\text{ENhh}}, \nu_{\text{ENhh}}) - [\text{hh}_1])}{H_{\text{hh}}} \\
\frac{d[\text{hh}_2]}{dt} &= \frac{T_0 \cdot (\phi([\text{EN}_2] \cdot \psi([\text{CN}_2], \kappa_{\text{CNhh}}, \nu_{\text{CNhh}}), \kappa_{\text{ENhh}}, \nu_{\text{ENhh}}) - [\text{hh}_2])}{H_{\text{hh}}} \\
\frac{d[\text{hh}_3]}{dt} &= \frac{T_0 \cdot (\phi([\text{EN}_3] \cdot \psi([\text{CN}_3], \kappa_{\text{CNhh}}, \nu_{\text{CNhh}}), \kappa_{\text{ENhh}}, \nu_{\text{ENhh}}) - [\text{hh}_3])}{H_{\text{hh}}} \\
\frac{d[\text{HH}_{0,0}]}{dt} &= \frac{T_0 \cdot \left(\frac{[\text{hh}_0]}{6} - [\text{HH}_{0,0}] \right)}{H_{\text{HH}}} \\
& + T_0 \cdot r_{\text{LMxferHH}} \cdot ([\text{HH}_{0,5}] + [\text{HH}_{0,1}] - 2 \cdot [\text{HH}_{0,0}]) \\
& - T_0 \cdot k_{\text{PTCHH}} \cdot [\text{PTC}]_0 \cdot [\text{PTC}_{0,3}] \cdot [\text{HH}_{0,0}] \\
\frac{d[\text{HH}_{0,1}]}{dt} &= \frac{T_0 \cdot \left(\frac{[\text{hh}_0]}{6} - [\text{HH}_{0,1}] \right)}{H_{\text{HH}}} \\
& + T_0 \cdot r_{\text{LMxferHH}} \cdot ([\text{HH}_{0,0}] + [\text{HH}_{0,2}] - 2 \cdot [\text{HH}_{0,1}]) \\
& - T_0 \cdot k_{\text{PTCHH}} \cdot [\text{PTC}]_0 \cdot [\text{PTC}_{1,4}] \cdot [\text{HH}_{0,1}] \\
\frac{d[\text{HH}_{0,2}]}{dt} &= \frac{T_0 \cdot \left(\frac{[\text{hh}_0]}{6} - [\text{HH}_{0,2}] \right)}{H_{\text{HH}}} \\
& + T_0 \cdot r_{\text{LMxferHH}} \cdot ([\text{HH}_{0,1}] + [\text{HH}_{0,3}] - 2 \cdot [\text{HH}_{0,2}]) \\
& - T_0 \cdot k_{\text{PTCHH}} \cdot [\text{PTC}]_0 \cdot [\text{PTC}_{1,5}] \cdot [\text{HH}_{0,2}]
\end{aligned}$$

$$\begin{aligned} \frac{d[\text{HH}_{0,3}]}{dt} &= \frac{T_0 \cdot \left(\frac{[\text{hh}_0]}{6} - [\text{HH}_{0,3}] \right)}{H_{\text{HH}}} \\ &+ T_0 \cdot r_{\text{LMxferHH}} \cdot ([\text{HH}_{0,2}] + [\text{HH}_{0,4}] - 2 \cdot [\text{HH}_{0,3}]) \\ &- T_0 \cdot k_{\text{PTCHH}} \cdot [\text{PTC}]_0 \cdot [\text{PTC}_{0,0}] \cdot [\text{HH}_{0,3}] \end{aligned}$$

$$\begin{aligned} \frac{d[\text{HH}_{0,4}]}{dt} &= \frac{T_0 \cdot \left(\frac{[\text{hh}_0]}{6} - [\text{HH}_{0,4}] \right)}{H_{\text{HH}}} \\ &+ T_0 \cdot r_{\text{LMxferHH}} \cdot ([\text{HH}_{0,3}] + [\text{HH}_{0,5}] - 2 \cdot [\text{HH}_{0,4}]) \\ &- T_0 \cdot k_{\text{PTCHH}} \cdot [\text{PTC}]_0 \cdot [\text{PTC}_{3,1}] \cdot [\text{HH}_{0,4}] \end{aligned}$$

$$\begin{aligned} \frac{d[\text{HH}_{0,5}]}{dt} &= \frac{T_0 \cdot \left(\frac{[\text{hh}_0]}{6} - [\text{HH}_{0,5}] \right)}{H_{\text{HH}}} \\ &+ T_0 \cdot r_{\text{LMxferHH}} \cdot ([\text{HH}_{0,4}] + [\text{HH}_{0,0}] - 2 \cdot [\text{HH}_{0,5}]) \\ &- T_0 \cdot k_{\text{PTCHH}} \cdot [\text{PTC}]_0 \cdot [\text{PTC}_{3,2}] \cdot [\text{HH}_{0,5}] \end{aligned}$$

$$\begin{aligned} \frac{d[\text{HH}_{1,0}]}{dt} &= \frac{T_0 \cdot \left(\frac{[\text{hh}_1]}{6} - [\text{HH}_{1,0}] \right)}{H_{\text{HH}}} \\ &+ T_0 \cdot r_{\text{LMxferHH}} \cdot ([\text{HH}_{1,5}] + [\text{HH}_{1,1}] - 2 \cdot [\text{HH}_{1,0}]) \\ &- T_0 \cdot k_{\text{PTCHH}} \cdot [\text{PTC}]_0 \cdot [\text{PTC}_{1,3}] \cdot [\text{HH}_{1,0}] \end{aligned}$$

$$\begin{aligned} \frac{d[\text{HH}_{1,1}]}{dt} &= \frac{T_0 \cdot \left(\frac{[\text{hh}_1]}{6} - [\text{HH}_{1,1}] \right)}{H_{\text{HH}}} \\ &+ T_0 \cdot r_{\text{LMxferHH}} \cdot ([\text{HH}_{1,0}] + [\text{HH}_{1,2}] - 2 \cdot [\text{HH}_{1,1}]) \\ &- T_0 \cdot k_{\text{PTCHH}} \cdot [\text{PTC}]_0 \cdot [\text{PTC}_{2,4}] \cdot [\text{HH}_{1,1}] \end{aligned}$$

$$\begin{aligned} \frac{d[\text{HH}_{1,2}]}{dt} &= \frac{T_0 \cdot \left(\frac{[\text{hh}_1]}{6} - [\text{HH}_{1,2}] \right)}{H_{\text{HH}}} \\ &+ T_0 \cdot r_{\text{LMxferHH}} \cdot ([\text{HH}_{1,1}] + [\text{HH}_{1,3}] - 2 \cdot [\text{HH}_{1,2}]) \\ &- T_0 \cdot k_{\text{PTCHH}} \cdot [\text{PTC}]_0 \cdot [\text{PTC}_{2,5}] \cdot [\text{HH}_{1,2}] \end{aligned}$$

$$\begin{aligned} \frac{d[\text{HH}_{1,3}]}{dt} &= \frac{T_0 \cdot \left(\frac{[\text{hh}_1]}{6} - [\text{HH}_{1,3}] \right)}{H_{\text{HH}}} \\ &+ T_0 \cdot r_{\text{LMxferHH}} \cdot ([\text{HH}_{1,2}] + [\text{HH}_{1,4}] - 2 \cdot [\text{HH}_{1,3}]) \\ &- T_0 \cdot k_{\text{PTCHH}} \cdot [\text{PTC}]_0 \cdot [\text{PTC}_{1,0}] \cdot [\text{HH}_{1,3}] \end{aligned}$$

$$\begin{aligned} \frac{d[\text{HH}_{1,4}]}{dt} &= \frac{T_0 \cdot \left(\frac{[\text{hh}_1]}{6} - [\text{HH}_{1,4}] \right)}{H_{\text{HH}}} \\ &+ T_0 \cdot r_{\text{LMxferHH}} \cdot ([\text{HH}_{1,3}] + [\text{HH}_{1,5}] - 2 \cdot [\text{HH}_{1,4}]) \\ &- T_0 \cdot k_{\text{PTCHH}} \cdot [\text{PTC}]_0 \cdot [\text{PTC}_{0,1}] \cdot [\text{HH}_{1,4}] \end{aligned}$$

$$\frac{d[\text{HH}_{1,5}]}{dt} = \frac{T_0 \cdot \left(\frac{[\text{hh}_1]}{6} - [\text{HH}_{1,5}] \right)}{H_{\text{HH}}}$$

$$\begin{aligned}
& + T_0 \cdot r_{LMxferHH} \cdot ([HH_{1,4}] + [HH_{1,0}] - 2 \cdot [HH_{1,5}]) \\
& - T_0 \cdot k_{PTCHH} \cdot [PTC]_0 \cdot [PTC_{0,2}] \cdot [HH_{1,5}]
\end{aligned}$$

$$\begin{aligned}
\frac{d[HH_{2,0}]}{dt} &= \frac{T_0 \cdot \left(\frac{[hh_2]}{6} - [HH_{2,0}] \right)}{H_{HH}} \\
& + T_0 \cdot r_{LMxferHH} \cdot ([HH_{2,5}] + [HH_{2,1}] - 2 \cdot [HH_{2,0}]) \\
& - T_0 \cdot k_{PTCHH} \cdot [PTC]_0 \cdot [PTC_{2,3}] \cdot [HH_{2,0}]
\end{aligned}$$

$$\begin{aligned}
\frac{d[HH_{2,1}]}{dt} &= \frac{T_0 \cdot \left(\frac{[hh_2]}{6} - [HH_{2,1}] \right)}{H_{HH}} \\
& + T_0 \cdot r_{LMxferHH} \cdot ([HH_{2,0}] + [HH_{2,2}] - 2 \cdot [HH_{2,1}]) \\
& - T_0 \cdot k_{PTCHH} \cdot [PTC]_0 \cdot [PTC_{3,4}] \cdot [HH_{2,1}]
\end{aligned}$$

$$\begin{aligned}
\frac{d[HH_{2,2}]}{dt} &= \frac{T_0 \cdot \left(\frac{[hh_2]}{6} - [HH_{2,2}] \right)}{H_{HH}} \\
& + T_0 \cdot r_{LMxferHH} \cdot ([HH_{2,1}] + [HH_{2,3}] - 2 \cdot [HH_{2,2}]) \\
& - T_0 \cdot k_{PTCHH} \cdot [PTC]_0 \cdot [PTC_{3,5}] \cdot [HH_{2,2}]
\end{aligned}$$

$$\begin{aligned}
\frac{d[HH_{2,3}]}{dt} &= \frac{T_0 \cdot \left(\frac{[hh_2]}{6} - [HH_{2,3}] \right)}{H_{HH}} \\
& + T_0 \cdot r_{LMxferHH} \cdot ([HH_{2,2}] + [HH_{2,4}] - 2 \cdot [HH_{2,3}]) \\
& - T_0 \cdot k_{PTCHH} \cdot [PTC]_0 \cdot [PTC_{2,0}] \cdot [HH_{2,3}]
\end{aligned}$$

$$\begin{aligned}
\frac{d[HH_{2,4}]}{dt} &= \frac{T_0 \cdot \left(\frac{[hh_2]}{6} - [HH_{2,4}] \right)}{H_{HH}} \\
& + T_0 \cdot r_{LMxferHH} \cdot ([HH_{2,3}] + [HH_{2,5}] - 2 \cdot [HH_{2,4}]) \\
& - T_0 \cdot k_{PTCHH} \cdot [PTC]_0 \cdot [PTC_{1,1}] \cdot [HH_{2,4}]
\end{aligned}$$

$$\begin{aligned}
\frac{d[HH_{2,5}]}{dt} &= \frac{T_0 \cdot \left(\frac{[hh_2]}{6} - [HH_{2,5}] \right)}{H_{HH}} \\
& + T_0 \cdot r_{LMxferHH} \cdot ([HH_{2,4}] + [HH_{2,0}] - 2 \cdot [HH_{2,5}]) \\
& - T_0 \cdot k_{PTCHH} \cdot [PTC]_0 \cdot [PTC_{1,2}] \cdot [HH_{2,5}]
\end{aligned}$$

$$\begin{aligned}
\frac{d[HH_{3,0}]}{dt} &= \frac{T_0 \cdot \left(\frac{[hh_3]}{6} - [HH_{3,0}] \right)}{H_{HH}} \\
& + T_0 \cdot r_{LMxferHH} \cdot ([HH_{3,5}] + [HH_{3,1}] - 2 \cdot [HH_{3,0}]) \\
& - T_0 \cdot k_{PTCHH} \cdot [PTC]_0 \cdot [PTC_{3,3}] \cdot [HH_{3,0}]
\end{aligned}$$

$$\begin{aligned}
\frac{d[HH_{3,1}]}{dt} &= \frac{T_0 \cdot \left(\frac{[hh_3]}{6} - [HH_{3,1}] \right)}{H_{HH}} \\
& + T_0 \cdot r_{LMxferHH} \cdot ([HH_{3,0}] + [HH_{3,2}] - 2 \cdot [HH_{3,1}])
\end{aligned}$$

$$\begin{aligned}
& - T_0 \cdot k_{\text{PTCHH}} \cdot [\text{PTC}]_0 \cdot [\text{PTC}_{0,4}] \cdot [\text{HH}_{3,1}] \\
\frac{d[\text{HH}_{3,2}]}{dt} &= \frac{T_0 \cdot \left(\frac{[\text{hh}_3]}{6} - [\text{HH}_{3,2}] \right)}{H_{\text{HH}}} \\
& + T_0 \cdot r_{\text{LMxferHH}} \cdot ([\text{HH}_{3,1}] + [\text{HH}_{3,3}] - 2 \cdot [\text{HH}_{3,2}]) \\
& - T_0 \cdot k_{\text{PTCHH}} \cdot [\text{PTC}]_0 \cdot [\text{PTC}_{0,5}] \cdot [\text{HH}_{3,2}] \\
\frac{d[\text{HH}_{3,3}]}{dt} &= \frac{T_0 \cdot \left(\frac{[\text{hh}_3]}{6} - [\text{HH}_{3,3}] \right)}{H_{\text{HH}}} \\
& + T_0 \cdot r_{\text{LMxferHH}} \cdot ([\text{HH}_{3,2}] + [\text{HH}_{3,4}] - 2 \cdot [\text{HH}_{3,3}]) \\
& - T_0 \cdot k_{\text{PTCHH}} \cdot [\text{PTC}]_0 \cdot [\text{PTC}_{3,0}] \cdot [\text{HH}_{3,3}] \\
\frac{d[\text{HH}_{3,4}]}{dt} &= \frac{T_0 \cdot \left(\frac{[\text{hh}_3]}{6} - [\text{HH}_{3,4}] \right)}{H_{\text{HH}}} \\
& + T_0 \cdot r_{\text{LMxferHH}} \cdot ([\text{HH}_{3,3}] + [\text{HH}_{3,5}] - 2 \cdot [\text{HH}_{3,4}]) \\
& - T_0 \cdot k_{\text{PTCHH}} \cdot [\text{PTC}]_0 \cdot [\text{PTC}_{2,1}] \cdot [\text{HH}_{3,4}] \\
\frac{d[\text{HH}_{3,5}]}{dt} &= \frac{T_0 \cdot \left(\frac{[\text{hh}_3]}{6} - [\text{HH}_{3,5}] \right)}{H_{\text{HH}}} \\
& + T_0 \cdot r_{\text{LMxferHH}} \cdot ([\text{HH}_{3,4}] + [\text{HH}_{3,0}] - 2 \cdot [\text{HH}_{3,5}]) \\
& - T_0 \cdot k_{\text{PTCHH}} \cdot [\text{PTC}]_0 \cdot [\text{PTC}_{2,2}] \cdot [\text{HH}_{3,5}] \\
\frac{d[\text{PH}_{0,0}]}{dt} &= T_0 \cdot k_{\text{PTCHH}} \cdot [\text{HH}]_0 \cdot [\text{HH}_{0,3}] \cdot [\text{PTC}_{0,0}] \\
& - \frac{T_0 \cdot [\text{PH}_{0,0}]}{H_{\text{PH}}} \\
\frac{d[\text{PH}_{0,1}]}{dt} &= T_0 \cdot k_{\text{PTCHH}} \cdot [\text{HH}]_0 \cdot [\text{HH}_{1,4}] \cdot [\text{PTC}_{0,1}] \\
& - \frac{T_0 \cdot [\text{PH}_{0,1}]}{H_{\text{PH}}} \\
\frac{d[\text{PH}_{0,2}]}{dt} &= T_0 \cdot k_{\text{PTCHH}} \cdot [\text{HH}]_0 \cdot [\text{HH}_{1,5}] \cdot [\text{PTC}_{0,2}] \\
& - \frac{T_0 \cdot [\text{PH}_{0,2}]}{H_{\text{PH}}} \\
\frac{d[\text{PH}_{0,3}]}{dt} &= T_0 \cdot k_{\text{PTCHH}} \cdot [\text{HH}]_0 \cdot [\text{HH}_{0,0}] \cdot [\text{PTC}_{0,3}] \\
& - \frac{T_0 \cdot [\text{PH}_{0,3}]}{H_{\text{PH}}} \\
\frac{d[\text{PH}_{0,4}]}{dt} &= T_0 \cdot k_{\text{PTCHH}} \cdot [\text{HH}]_0 \cdot [\text{HH}_{3,1}] \cdot [\text{PTC}_{0,4}] \\
& - \frac{T_0 \cdot [\text{PH}_{0,4}]}{H_{\text{PH}}} \\
\frac{d[\text{PH}_{0,5}]}{dt} &= T_0 \cdot k_{\text{PTCHH}} \cdot [\text{HH}]_0 \cdot [\text{HH}_{3,2}] \cdot [\text{PTC}_{0,5}]
\end{aligned}$$

$$\begin{aligned}
& - \frac{T_0 \cdot [PH_{0,5}]}{H_{PH}} \\
\frac{d[PH_{1,0}]}{dt} &= T_0 \cdot k_{PTCHH} \cdot [HH]_0 \cdot [HH_{1,3}] \cdot [PTC_{1,0}] \\
& - \frac{T_0 \cdot [PH_{1,0}]}{H_{PH}} \\
\frac{d[PH_{1,1}]}{dt} &= T_0 \cdot k_{PTCHH} \cdot [HH]_0 \cdot [HH_{2,4}] \cdot [PTC_{1,1}] \\
& - \frac{T_0 \cdot [PH_{1,1}]}{H_{PH}} \\
\frac{d[PH_{1,2}]}{dt} &= T_0 \cdot k_{PTCHH} \cdot [HH]_0 \cdot [HH_{2,5}] \cdot [PTC_{1,2}] \\
& - \frac{T_0 \cdot [PH_{1,2}]}{H_{PH}} \\
\frac{d[PH_{1,3}]}{dt} &= T_0 \cdot k_{PTCHH} \cdot [HH]_0 \cdot [HH_{1,0}] \cdot [PTC_{1,3}] \\
& - \frac{T_0 \cdot [PH_{1,3}]}{H_{PH}} \\
\frac{d[PH_{1,4}]}{dt} &= T_0 \cdot k_{PTCHH} \cdot [HH]_0 \cdot [HH_{0,1}] \cdot [PTC_{1,4}] \\
& - \frac{T_0 \cdot [PH_{1,4}]}{H_{PH}} \\
\frac{d[PH_{1,5}]}{dt} &= T_0 \cdot k_{PTCHH} \cdot [HH]_0 \cdot [HH_{0,2}] \cdot [PTC_{1,5}] \\
& - \frac{T_0 \cdot [PH_{1,5}]}{H_{PH}} \\
\frac{d[PH_{2,0}]}{dt} &= T_0 \cdot k_{PTCHH} \cdot [HH]_0 \cdot [HH_{2,3}] \cdot [PTC_{2,0}] \\
& - \frac{T_0 \cdot [PH_{2,0}]}{H_{PH}} \\
\frac{d[PH_{2,1}]}{dt} &= T_0 \cdot k_{PTCHH} \cdot [HH]_0 \cdot [HH_{3,4}] \cdot [PTC_{2,1}] \\
& - \frac{T_0 \cdot [PH_{2,1}]}{H_{PH}} \\
\frac{d[PH_{2,2}]}{dt} &= T_0 \cdot k_{PTCHH} \cdot [HH]_0 \cdot [HH_{3,5}] \cdot [PTC_{2,2}] \\
& - \frac{T_0 \cdot [PH_{2,2}]}{H_{PH}} \\
\frac{d[PH_{2,3}]}{dt} &= T_0 \cdot k_{PTCHH} \cdot [HH]_0 \cdot [HH_{2,0}] \cdot [PTC_{2,3}] \\
& - \frac{T_0 \cdot [PH_{2,3}]}{H_{PH}} \\
\frac{d[PH_{2,4}]}{dt} &= T_0 \cdot k_{PTCHH} \cdot [HH]_0 \cdot [HH_{1,1}] \cdot [PTC_{2,4}] \\
& - \frac{T_0 \cdot [PH_{2,4}]}{H_{PH}} \\
\frac{d[PH_{2,5}]}{dt} &= T_0 \cdot k_{PTCHH} \cdot [HH]_0 \cdot [HH_{1,2}] \cdot [PTC_{2,5}]
\end{aligned}$$

$$\begin{aligned}
& - \frac{T_0 \cdot [\text{PH}_{2,5}]}{H_{\text{PH}}} \\
\frac{d[\text{PH}_{3,0}]}{dt} &= T_0 \cdot \kappa_{\text{PTCHH}} \cdot [\text{HH}]_0 \cdot [\text{HH}_{3,3}] \cdot [\text{PTC}_{3,0}] \\
& - \frac{T_0 \cdot [\text{PH}_{3,0}]}{H_{\text{PH}}} \\
\frac{d[\text{PH}_{3,1}]}{dt} &= T_0 \cdot \kappa_{\text{PTCHH}} \cdot [\text{HH}]_0 \cdot [\text{HH}_{0,4}] \cdot [\text{PTC}_{3,1}] \\
& - \frac{T_0 \cdot [\text{PH}_{3,1}]}{H_{\text{PH}}} \\
\frac{d[\text{PH}_{3,2}]}{dt} &= T_0 \cdot \kappa_{\text{PTCHH}} \cdot [\text{HH}]_0 \cdot [\text{HH}_{0,5}] \cdot [\text{PTC}_{3,2}] \\
& - \frac{T_0 \cdot [\text{PH}_{3,2}]}{H_{\text{PH}}} \\
\frac{d[\text{PH}_{3,3}]}{dt} &= T_0 \cdot \kappa_{\text{PTCHH}} \cdot [\text{HH}]_0 \cdot [\text{HH}_{3,0}] \cdot [\text{PTC}_{3,3}] \\
& - \frac{T_0 \cdot [\text{PH}_{3,3}]}{H_{\text{PH}}} \\
\frac{d[\text{PH}_{3,4}]}{dt} &= T_0 \cdot \kappa_{\text{PTCHH}} \cdot [\text{HH}]_0 \cdot [\text{HH}_{2,1}] \cdot [\text{PTC}_{3,4}] \\
& - \frac{T_0 \cdot [\text{PH}_{3,4}]}{H_{\text{PH}}} \\
\frac{d[\text{PH}_{3,5}]}{dt} &= T_0 \cdot \kappa_{\text{PTCHH}} \cdot [\text{HH}]_0 \cdot [\text{HH}_{2,2}] \cdot [\text{PTC}_{3,5}] \\
& - \frac{T_0 \cdot [\text{PH}_{3,5}]}{H_{\text{PH}}}
\end{aligned}$$

Optimizable Parameters

κ_{WGen}	0.1
κ_{CNeN}	0.1
κ_{WGwg}	0.1
κ_{CIDwg}	0.1
κ_{CNwg}	0.1
κ_{CIDptc}	0.1
κ_{CNptc}	0.1
κ_{Bcid}	0.1
κ_{ENcid}	0.1
κ_{PTCCID}	0.1
κ_{ENhh}	0.1
κ_{CNhh}	0.1
κ_{PTCHH}	0.0001
$[\text{PTC}]_0$	1000.0
$[\text{HH}]_0$	1000.0
C_{CID}	0.1
ν_{WGen}	1.0
ν_{CNeN}	1.0
ν_{WGwg}	1.0

ν_{CIDwg}	1.0
ν_{CNwg}	1.0
ν_{CIDptc}	1.0
ν_{CNptc}	1.0
ν_{Bcid}	1.0
ν_{ENcid}	1.0
ν_{PTCCID}	1.0
ν_{ENhh}	1.0
ν_{CNhh}	1.0
H_{en}	7.0
H_{EN}	15.0
H_{wg}	7.0
H_{IWG}	15.0
H_{EWG}	15.0
H_{ptc}	7.0
H_{PTC}	15.0
H_{cid}	7.0
H_{CID}	15.0
H_{CN}	15.0
H_{hh}	7.0
H_{HH}	15.0
H_{PH}	15.0
α_{wg}	1.0
β_{wg}	1.0
Γ_{EndoWG}	0.001
Γ_{ExoWG}	0.1
$\Gamma_{MxferWG}$	0.001
$\Gamma_{LMxferWG}$	0.1
$\Gamma_{LMxferPTC}$	0.1
$\Gamma_{LMxferHH}$	0.1