Differential Equations

$$
\begin{aligned}
\frac{d\,[\mathrm{X1}]}{dt} &= \mathrm{kf_{R3}} \cdot [\mathrm{X3}] \\
&\quad - \frac{\mathrm{kf_{R3}} \cdot [\mathrm{X1}]}{\mathrm{KE_{R3}}} \\
&\quad - \mathrm{kf_{R1}} \cdot [\mathrm{X1}] \cdot [\mathrm{X0}]
\end{aligned}
$$

$$
\begin{aligned}
\frac{d\,[\mathrm{X2}]}{dt} &= \mathrm{kf_{R1}} \cdot [\mathrm{X1}] \cdot [\mathrm{X0}] \cdot 2 \\
&\quad + \frac{\mathrm{kf_{R2}} \cdot [\mathrm{X3}]}{\mathrm{KE_{R2}}} \\
&\quad - \mathrm{kf_{R2}} \cdot [\mathrm{X2}]
\end{aligned}
$$

$$
\begin{aligned}
\frac{d\,[\mathrm{X3}]}{dt} &= \mathrm{kf_{R2}} \cdot [\mathrm{X2}] \\
&\quad + \frac{\mathrm{kf_{R3}} \cdot [\mathrm{X1}]}{\mathrm{KE_{R3}}} \\
&\quad - \frac{\mathrm{kf_{R2}} \cdot [\mathrm{X3}]}{\mathrm{KE_{R2}}} \\
&\quad - \mathrm{kf_{R3}} \cdot [\mathrm{X3}] \\
&\quad - \mathrm{kf_{R4}} \cdot [\mathrm{X3}]
\end{aligned}
$$

Optimizable Parameters

$\mathrm{kf_{R1}}$	1
$\mathrm{kf_{R2}}$	1
$\mathrm{kf_{R3}}$	1
$\mathrm{kf_{R4}}$	0.5