CRN

$$
\begin{aligned}
k_1 : A + B &\rightarrow 2B \\
k_2 : B &\rightarrow A
\end{aligned}
$$

$$
\begin{aligned}
\frac{d[A]}{dt} &= -k_1[A][B] + k_2[B] \\
\frac{d[B]}{dt} &= k_1[A][B] - k_2[B]
\end{aligned}
$$

GRN

$$
\begin{aligned}
\frac{dg_1}{dt} &= k_{1s} \cdot \frac{1}{1+k_{13}g_3} - k_{1d}g_1 \\
\frac{dg_2}{dt} &= k_{2s} \cdot \frac{k_{21}g_1}{1+k_{21}g_1} - k_{2d}g_2 \\
\frac{dg_3}{dt} &= k_{3s} \cdot \frac{k_{31}g_1}{1+k_{31}g_1} \cdot \frac{k_{32}g_2}{1+k_{32}g_2} - k_{3d}g_3
\end{aligned}
$$

ERN

$$
\begin{aligned}
\frac{dN}{dt} &= aN - bNP \\
\frac{dP}{dt} &= -cP + bNP
\end{aligned}
$$

$$
\frac{dN_i}{dt} = r_i N_i + \sum_{j=1}^{n} a_{ij} N_i N_j
$$