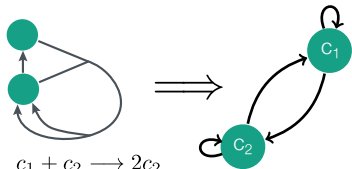


## CRN



$$k_1: c_1 + c_2 \longrightarrow 2c_2$$

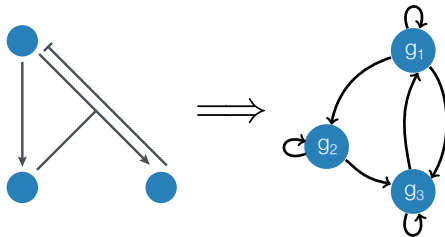
$$k_2: c_2 \longrightarrow c_1$$

$$\frac{dc_1}{dt} = -k_1 c_1 c_2 + k_2 c_2$$

$$\frac{dc_2}{dt} = k_1 c_1 c_2 - k_2 c_2$$

$$\frac{dc_i}{dt} = \sum_{\mu=1}^M k_{\mu} \prod_{j=1}^N (c_j)^{r_{\mu j}} (p_{\mu i} - r_{\mu i})$$

## GRN



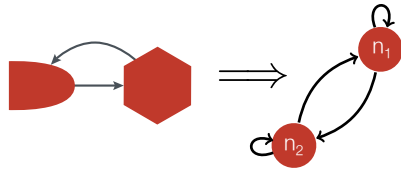
$$\frac{dg_1}{dt} = k_{1s} \cdot \frac{1}{1 + k_{13}g_3} - k_{1d}g_1$$

$$\frac{dg_2}{dt} = k_{2s} \cdot \frac{k_{21}g_1}{1 + k_{21}g_1} - k_{2d}g_2$$

$$\frac{dg_3}{dt} = k_{3s} \cdot \frac{k_{31}g_1}{1 + k_{31}g_1} \cdot \frac{k_{32}g_2}{1 + k_{32}g_2} - k_{3d}g_3$$

$$\frac{dg_i}{dt} = k_{is} \prod_{j=1}^N \frac{k_{ija} g_j^{n_{ija}}}{1 + k_{ija} g_j^{n_{ija}}} \frac{1}{1 + k_{ijr} g_j^{n_{ijr}}} - k_{id} g_i$$

## ERN



$$\frac{dn_1}{dt} = a n_1 - b n_1 n_2$$

$$\frac{dn_2}{dt} = -c n_2 + b n_1 n_2$$

$$\frac{dn_i}{dt} = r_i n_i + \sum_{j=1}^N b_{ij} n_i n_j$$