Modèle de Selkov

$$\gamma S_2 + E \underset{k'_3}{\overset{k_3}{\rightleftharpoons}} ES_2^{\gamma}$$

$\gamma = 2$

$S_2 + E \rightleftharpoons ES_2$

$S_2 + ES_2 \rightleftharpoons ES_2^2$

$$S_1 + ES_2^{\gamma} \underset{k'_1}{\overset{k_1}{\rightleftharpoons}} S_1 ES_2^{\gamma} \xrightarrow{k_2} ES_2^{\gamma} + S_2$$

$e = [E]$

$$\nu_1 \rightarrow S_1 \; , \; S_2 \xrightarrow{\nu_2}$$

$S_i = [S_i]$; $x_1 = [ES_2^{\gamma}]$; $x_2 = [ES_2^{\gamma}]$

$$\frac{dS_1}{dt} = -k_1 S_1 x_1 + k'_1 x_2 + \nu_1$$

$$\frac{dS_2}{dt} = -k_3 S_2^{\gamma} e + \gamma k'_3 x_1 + k_2 x_2 - \nu_2 S_2$$

Ecuaciones para c, x_1 y x_2

$$\gamma S_2 + E \underset{k'_3}{\overset{k_3}{\rightleftharpoons}} ES_2^{\gamma} \quad ; \quad S_1 + ES_2^{\gamma} \underset{k'_1}{\overset{k_1}{\rightleftharpoons}} S_1 ES_2^{\gamma} \xrightarrow{k_2} ES_2^{\gamma} + S_2$$

$$\left[\frac{dc}{dt}\right] = \frac{\text{Conc}}{\text{tiempo}} = [k_3 S_2^{\gamma} e]$$

$$\frac{dc}{dt} = -k_3 S_2^{\gamma} e + k'_3 x_1$$

$$\frac{dx_1}{dt} = k_3 e S_2^{\gamma} - k'_3 x_1 - k_1 S_1 x_1 + k'_1 x_2 + k_2 x_2$$

$$\frac{dx_2}{dt} = k_1 S_1 x_1 - k'_1 x_2 - k_2 x_2$$

$$\frac{d}{dt}(e + x_1 + x_2) = 0 \Rightarrow e + x_1 + x_2 = e_0 = \text{cons}^t$$

$$\Rightarrow e = e_0 - x_1 - x_2$$

$$\Rightarrow [k_3] \equiv \frac{1}{\text{tconc}^{\gamma}}$$

$$[k_3 S_2^{\gamma} e] = [k_3][S_2]^{\gamma}[e] = [k_3] \cdot \text{conc}^{\gamma+1} = \frac{\text{Conc}}{\text{tiempo}}$$

$$[k'_3] = 1/\text{tiempo}$$

$$\left[\frac{k_3'}{k_3}\right] = \frac{1/\text{time}}{1/(\text{conc}^{\gamma}\cdot\text{time})} = \frac{1}{1/\text{conc}^{\gamma}} =$$

$$= \text{conc}^{\gamma}$$

$$\Rightarrow \left(\frac{k_3'}{k_3}\right)^{1/\gamma} = [\text{conc}]$$

$$S + E_1 \underset{k'_1}{\overset{k_1}{\rightleftharpoons}} C_1 \xrightarrow{k_2} P_1 + E_1$$

$$S + E_2 \underset{k'_3}{\overset{k_3}{\rightleftharpoons}} C_2 \xrightarrow{k_4} P_2 + E_2$$

$$\frac{d[S]}{dt} = -k_1[S][E_1] + k'_1[C_1] - k_3[S][E_2] + k'_3[C_2]$$

$$= -k_1 S_0 \sigma e_{o1}(1 - x_1) + k'_1 e_{o1} x_1 - \sigma(1 - x_1) + \alpha x_1$$

$$\frac{d[E_1]}{dt} = -k_1[S][E_1] + k'_1[C_1] + k_2[C_1]$$

$$\frac{d[C_1]}{dt} = k_1[S][E_1] - k'_1[C_1] - k_2[C_1]$$

$$e_{o1} = const = [E_1] + [C_1] \rightarrow [E_1] = e_{o1} - [C_1]$$

$$e_{o2} = const = [E_2] + [C_2] \rightarrow [E_2] = e_{o2} - [C_2]$$

$$\sigma = [S]/S_0$$

$$x_1 = [C_1]/e_{o1}$$

$$\alpha = \frac{[C_2]}{e_{o2}}$$