

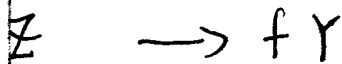
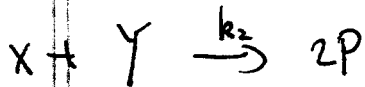
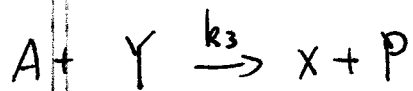
$$\frac{dx}{dt} = k_1 AY - k_2 XY + k_3 AX - 2k_4 X^2$$

$$\frac{dY}{dt} = -k_1 AY - k_2 XY + f k_5 Z$$

$$\frac{dZ}{dt} = 2k_3 AX - k_5 Z$$

$$X \rightarrow \frac{k_1 A}{k_2} x \quad Z \rightarrow 2 \frac{k_1 k_3 A^2}{k_2 k_5} z$$

$$Y \rightarrow \frac{k_3 A}{k_2} y \quad t \rightarrow \frac{1}{k_1 A} t^*$$



$$K_1 = k_3 [\text{H}^+]^2 \sim 2 \text{ M}^{-1} \text{ s}^{-1}$$

$$K_2 = k_2 [\text{H}^+] \sim 3 \times 10^6 \text{ M}^{-1} \text{ s}^{-1}$$

$$K_3 = k_5 [\text{H}^+] \sim 40 \text{ M}^{-1} \text{ s}^{-1}$$

$$K_4 = k_4 \sim 3 \times 10^3 \text{ M}^{-1} \text{ s}^{-1}$$

$$K_5 = 0.6 [\text{BrMA}] \text{ M}^{-1} \text{ s}^{-1}$$

$$k_5 \approx 1.8 \times 10^2 \text{ s}^{-1}$$

$$\text{w/ } [\text{H}^+] \approx 1 \text{ M}$$

$$[\text{BrMA}] \approx 0.03 \text{ M}$$

M is mole/liter

$$A \approx 6 \times 10^{-2} \text{ M}$$

$$\frac{k_1 A}{k_2} \sim 4 \times 10^{-8} M$$

$$\frac{k_3 A}{k_2} \sim 0.8 \times 10^{-6} M$$

$$\frac{2k_1 k_3 A^2}{k_2 k_5} \sim 1.1 \times 10^{-5} M$$

$$t \sim \frac{1}{k_1 A} \sim 8.3 s$$

(H⁺)

$$\Sigma \dot{x} = x + y - xy - \rho x^2$$

$$\dot{y} = 2fz - y - xy$$

$$P \dot{z} = x - z$$

$$\frac{\Sigma}{P} \frac{dx}{dt} = \rho y - xy + x(1-x)$$

$$\frac{f}{P} \frac{dy}{dt} = -\rho y - xy + 2fz$$

$$\frac{1}{(H^+)^2} \frac{dz}{dt} = x - z$$

$$\epsilon = k_1/k_3 \sim 0.05$$

$$\epsilon \sim \frac{k_3 [H^+]}{k_5}$$

$$P = k_1 A/k_5 \sim 6.7$$

$$\frac{k_1 A}{k_5} = \frac{k_3 [H^+]^2 \cdot A}{0.6 [BMA]} = \frac{k_3 [H^+]^2 A}{0.6 [BMA]}$$

$$f = 2k_1 k_4/k_2 k_3 \sim 10^{-4}$$

$$\frac{2k_1 k_4}{k_2 k_3} = \frac{2k_3 [H^+]^2 k_4}{k_2 [H^+] k_5 [H^+]} = \frac{2k_3 k_4}{k_2 k_5}$$

~~$$t_0 = P$$~~
~~$$\rho f = P f$$~~

$$\frac{\epsilon}{P} = \hat{\epsilon}$$

$$\frac{f}{P} = \delta$$

$$f = \hat{f}$$

$$\partial_t X = A - (B+1)X + x^2 Y + D_x \nabla^2 X$$

$$\partial_t Y = BX - x^2 Y + D_y \nabla^2 Y$$

$$\text{set } D_x = D_y = D$$

$$X \Rightarrow \alpha X$$

$$Y \Rightarrow \beta Y$$

$$\begin{cases} \alpha \partial_t X = A - \alpha(B+1)X + \alpha^2 \beta x^2 y + \alpha D \nabla^2 X \\ \beta \partial_t Y = \alpha B X - \alpha^2 \beta x^2 y + \beta D \nabla^2 Y \end{cases}$$

$$\partial_t \rightarrow \gamma \partial_t$$

$$\begin{cases} \alpha \gamma \partial_t X = (A - \alpha B X) - \alpha X + \alpha^2 \beta x^2 y + \alpha D \nabla^2 X \\ \beta \gamma \partial_t Y = \alpha B X - \alpha^2 \beta x^2 y + \beta D \nabla^2 Y \end{cases}$$

$$\partial_t X = \frac{A(1 - \frac{\alpha B}{A} X)}{\alpha \gamma} + \frac{1}{\gamma} (-X\alpha + \alpha^2 \beta x^2 y) + \frac{D}{\gamma} \nabla^2 X$$

$$\alpha = \frac{A}{B}$$

$$\alpha^2 \beta = 1$$

$$\beta = \frac{B}{A}$$

$$\frac{\alpha}{\beta} = \frac{A/B}{B/A} = \frac{A^2}{B^2}$$

$$\partial_t Y = \frac{\alpha B}{\beta \gamma} X - \frac{\alpha^2 \beta}{\gamma \beta} x^2 y + \frac{D}{\gamma} \nabla^2 Y$$

$$= \frac{A^2}{B^2 \gamma} X - \frac{A^2}{B^2 \gamma} x^2 y + \frac{D}{\gamma} \nabla^2 Y$$

$$\partial_t Y = \frac{A^2}{B^2 \gamma} (1 - x^2 y) + \frac{D}{\gamma} \nabla^2 Y$$

$$\partial_t x = \frac{A}{\alpha r} (1-x) + \frac{\alpha}{\gamma} (-x + x^2 y) + \frac{D}{\gamma} \nabla^2 x$$

$$\partial_t y = \frac{A^2}{B^2 \gamma} (x - x^2 y) + \frac{D}{\gamma} \nabla^2 y$$

Define $\frac{A}{\alpha r} \equiv K$ $\frac{\alpha}{\gamma} \equiv \beta$ $\bar{\gamma} \equiv \frac{A^2}{B^2 \gamma}$ $\frac{D}{\gamma} \equiv \bar{D}$

get

$$\begin{cases} \partial_t x = K(1-x) + \beta(-x + x^2 y) + \bar{D} \nabla^2 x \\ \partial_t y = \bar{\gamma}(x - x^2 y) + \bar{D} \nabla^2 y \end{cases}$$