附公式表：

$c = 2.998 \times 10^8\ \mathrm{m \cdot s^{-1}}$ $e = 1.602 \times 10^{-19}\ \mathrm{C}$ $N_A = 6.022 \times 10^{23}\ \mathrm{mol^{-1}}$ $h = 6.626 \times 10^{-34}\ \mathrm{J \cdot s}$

$k = 1.381 \times 10^{-23}\ \mathrm{J \cdot K^{-1}}$ $R = 8.314\ \mathrm{J \cdot K^{-1} \cdot mol^{-1}}$ $F = 9.649 \times 10^4\ \mathrm{C \cdot mol^{-1}}$

$$E_{n_1,n_2,n_3} = \left(\frac{{n_1}^2}{a^2} + \frac{{n_2}^2}{b^2} + \frac{{n_3}^2}{c^2}\right)\frac{h^2}{8m} \qquad E_J = J(J+1)\frac{h^2}{8\pi^2 I} \qquad E_V = \left(V + \frac{1}{2}\right)h\nu$$

$$P_i = \frac{W_i}{\sum_{i=1}^{n} W_i} \qquad W = \frac{N!}{\prod_{i=1}^{n} N_i!} \qquad \ln(x!) = x\ln x - x \qquad S \equiv k\ln W \qquad T \equiv \left(\frac{\partial U}{\partial S}\right)_{V,n}$$

$$\frac{P(\varepsilon)}{P(0)} = \mathrm{e}^{-\frac{\varepsilon}{kT}} \qquad f = \frac{1}{P(0)} \equiv \sum_{i=1}^{n} \mathrm{e}^{-\frac{\varepsilon_i}{kT}} \qquad \frac{C(h)}{C(0)} = \frac{P(h)}{P(0)} = \mathrm{e}^{-\frac{\Delta\rho V g h}{kT}} \qquad \frac{C_i}{C_j} = \frac{P(E_i)}{P(E_j)} \qquad \frac{C_i}{C_j} = \mathrm{e}^{-\frac{E_i - E_j}{RT}}$$

$$f = \prod_{j=1}^{m} f_j \qquad f_{\text{平动}} = \frac{(2\pi m)^{3/2}}{h^3}(kT)^{3/2}V \qquad f_{\text{转动,线性}} = \frac{8\pi^2 I}{h^2}kT = \frac{1}{hcB}kT \qquad f_{\text{转动,非线性}} = \left(\frac{kT}{hc}\right)^{3/2}\left(\frac{\pi}{ABC}\right)^{1/2}$$

$$f_{\text{振动}j} = \sum_{V=0}^{\infty} \mathrm{e}^{-\frac{Vh\nu_j}{kT}} = \frac{1}{1 - \mathrm{e}^{-\frac{h\nu_j}{kT}}} \qquad f_{\text{振动}} = \prod_{j=1}^{m} f_{\text{振动}j} \qquad f_{\text{电子}} = g_{\text{基态}} \qquad f_{\text{分子}} = f_{\text{电子}} f_{\text{振动}} f_{\text{转动}} f_{\text{平动}}$$

$$U(T) = NkT^2\frac{\mathrm{d}\left(\ln f_{\text{总}}\right)}{\mathrm{d}T} + U(0) \qquad Q_j = U_j(T) - U_j(0) = NkT^2\frac{\mathrm{d}(\ln f_j)}{\mathrm{d}T} \qquad Q = U(T) - U(0) = NkT^2\frac{\mathrm{d}\left(\ln f_{\text{总}}\right)}{\mathrm{d}T}$$

$$Q_x = \frac{1}{2}NkT = \frac{1}{2}nRT \qquad Q_{\text{平动}} = Q_x + Q_y + Q_z = \frac{3}{2}NkT = \frac{3}{2}nRT \qquad Q_{\text{转动,线性}} = NkT = nRT$$

$$Q_{\text{转动,非线性}} = \frac{3}{2}NkT = \frac{3}{2}nRT \qquad Q_{\text{振动}j} = \frac{Nh\nu_j}{\mathrm{e}^{h\nu_j/kT} - 1} \qquad Q_{\text{振动}j,\text{高温}} = NkT = nRT$$

$$S_j = \frac{Q_j}{T} + Nk\ln f_j = Nk\frac{\mathrm{d}(T\ln f_j)}{\mathrm{d}T} \qquad S_{\text{定域}} = \sum_{j=1}^{m} S_j = Nk\frac{\mathrm{d}\left(T\ln f_{\text{总}}\right)}{\mathrm{d}T} \qquad S_{\text{离域}} = \frac{Q}{T} + Nk\ln\frac{\mathrm{e}f_{\text{总}}}{N}$$

$$S_{\text{平动}} = \frac{5}{2}Nk + Nk\ln\frac{f_{\text{平动}}}{N} \qquad S_{\text{转动,线性}} = Nk\ln\left(\frac{\mathrm{e}kT}{hcB}\right) \qquad S_{\text{转动,非线性}} = Nk\ln\left(\frac{\pi\mathrm{e}^3k^3T^3}{ABCh^3c^3}\right)^{1/2}$$

$$S_{\text{振动}j} = \frac{Nkh\nu_j}{kT\left(\mathrm{e}^{h\nu_j/kT} - 1\right)} + Nk\ln\frac{1}{1 - \mathrm{e}^{-h\nu_j/kT}} \qquad S_{\text{振动}j,\text{高温}} = Nk + Nk\ln\frac{kT}{h\nu_j} = Nk\ln\frac{\mathrm{e}kT}{h\nu_j}$$

$$\Delta U = q + w \qquad \mathrm{d}U = \mathrm{d}q + \mathrm{d}w \qquad \mathrm{d}w = -P_{\text{外}}\mathrm{d}V \qquad C_V \equiv \left(\frac{\partial U}{\partial T}\right)_V \qquad \mathrm{d}q_V = C_V\mathrm{d}T$$

$$H \equiv U + PV \qquad C_P \equiv \left(\frac{\partial H}{\partial T}\right)_P \qquad \mathrm{d}q_P = C_P\mathrm{d}T \qquad C_P = C_V + nR \qquad \frac{T_{\text{终,绝热}}}{T_{\text{始,绝热}}} = \left(\frac{V_{\text{终}}}{V_{\text{始}}}\right)^{-\frac{nR}{C_V}}$$

$$\mathrm{d}S_{\text{孤}} \geq 0 \qquad \mathrm{d}S_{\text{总}} = \mathrm{d}S + \mathrm{d}S_{\text{环}} \geq 0 \qquad \mathrm{d}S \equiv \frac{\mathrm{d}q_{\text{可逆}}}{T} \qquad \mathrm{d}S_{\text{环}} = \frac{\mathrm{d}q_{\text{可逆,环}}}{T_{\text{环}}} = -\frac{\mathrm{d}q}{T_{\text{环}}} \qquad \mathrm{d}S \geq \frac{\mathrm{d}q}{T_{\text{环}}}$$

$$\Delta S = \int_{\text{始}}^{\text{终}} \frac{\mathrm{d}U}{T} + \int_{\text{始}}^{\text{终}} \frac{P\mathrm{d}V}{T} \qquad A \equiv U - TS \qquad \mathrm{d}A = \mathrm{d}U - T\mathrm{d}S \leq \mathrm{d}w_{\text{非}} \qquad G \equiv H - TS \qquad \mathrm{d}G = \mathrm{d}H - T\mathrm{d}S \leq \mathrm{d}w_{\text{非}}$$

$$\mathrm{d}B = \left(\frac{\partial B}{\partial X}\right)_{Y,n_1,n_2,\ldots,n_C}\mathrm{d}X + \left(\frac{\partial B}{\partial Y}\right)_{X,n_1,n_2,\ldots,n_C}\mathrm{d}Y + \sum_{i=1}^{C}\left(\frac{\partial B}{\partial n_i}\right)_{X,Y,n\neq n_i}\mathrm{d}n_i \qquad \mu_i \equiv \left(\frac{\partial U}{\partial n_i}\right)_{S,V,n\neq n_i}$$

$$\mathrm{d}U = T\mathrm{d}S - P\mathrm{d}V + \sum_{i=1}^{C}\mu_i\mathrm{d}n_i \qquad \mathrm{d}H = T\mathrm{d}S + V\mathrm{d}P + \sum_{i=1}^{C}\mu_i\mathrm{d}n_i \qquad \mathrm{d}A = -S\mathrm{d}T - P\mathrm{d}V + \sum_{i=1}^{C}\mu_i\mathrm{d}n_i$$

$$\mathrm{d}G = -S\mathrm{d}T + V\mathrm{d}P + \sum_{i=1}^{C} \mu_i \mathrm{d}n_i \qquad \frac{1}{2}RT = E_{k,x} = E_{k,y} = E_{k,z} = \frac{1}{3}E_k \qquad \Phi = \delta d \qquad \Phi^* = \alpha'\Sigma$$

$$\frac{E_{分子}}{E^{O}{}_{分子}} = 2\left(\frac{d}{d^{O}}\right)^{-6} - \left(\frac{d}{d^{O}}\right)^{-12} \qquad E_{m,分子} = RT_{沸点} - \Delta H_{m蒸发,沸点} = \left(R - \Delta S_{m蒸发沸点}\right)T_{沸点}$$

$$C_{P,m液} = 2\left(C_{P,m气} - R\right) \qquad \mu_1 \equiv \mu_2 \equiv \cdots \equiv \mu_j \qquad \frac{\mathrm{d}P}{\mathrm{d}T} = \frac{\Delta S_{m平衡}}{\Delta V_{m平衡}} = \frac{\Delta H_{m平衡}}{T\Delta V_{m平衡}} \qquad \frac{\mathrm{d}P^*}{\mathrm{d}T} = \frac{P^*\Delta H_{m平衡，蒸发}}{RT^2}$$

$$\mu_{气,理} = \mu^{\Theta} + RT\ln\frac{P}{P^{\Theta}} \qquad \mu_{气,实} = \mu^{\Theta} + RT\ln\frac{\xi}{P^{\Theta}} \qquad \xi = \gamma P \qquad \mu_{液} = \mu^* = \mu^{\Theta} + RT\ln\frac{P^*}{P^{\Theta}}$$

$$\mu_{固} = \mu^{\Theta} + RT\ln\frac{P^*}{P^{\Theta}} \qquad P_i = \tau_i P \qquad P = \frac{RT\sum_{i=1}^{C} n_i}{V} \qquad \tau_i \equiv \frac{n_i}{\sum_{i=1}^{C} n_i} \qquad \mu_i = \mu_i{}^{\Theta} + RT\ln\frac{P_i}{P_i{}^{\Theta}}$$

$$\Delta_{混}G = \sum_{i=1}^{C} n_i RT\ln\tau_i \qquad \Delta_{混}S = \sum_{i=1}^{C} -n_i R\ln\tau_i \qquad \Delta_{混}H \equiv 0 \qquad \Delta_{混}U \equiv 0 \qquad \Delta_{混}A \equiv \Delta_{混}G$$

$$\Delta_{混}G = \sum_{i=1}^{C} n_i RT\ln\chi_i \qquad \Delta_{混}S = \sum_{i=1}^{C} -n_i R\ln\chi_i \qquad \Delta_{混}V \equiv 0 \qquad \Delta_{混}H \equiv 0 \qquad \Delta_{混}U \equiv 0 \qquad \Delta_{混}A \equiv \Delta_{混}G$$

$$\mu_{i,液,理} = \mu_i{}^* + RT\ln\chi_i \qquad P_i = \chi_i P_i^* \qquad \mathrm{d}X = \left(\frac{\partial X}{\partial T}\right)_{P,n}\mathrm{d}T + \left(\frac{\partial X}{\partial P}\right)_{T,n}\mathrm{d}P + \sum_{i=1}^{C}\left(\frac{\partial X}{\partial n_i}\right)_{T,P,n\neq n_i}\mathrm{d}n_i$$

$${}^{m}X_i = \left(\frac{\partial X}{\partial n_i}\right)_{T,P,n\neq n_i} \qquad X = \sum_{i=1}^{C} {}^{m}X_i n_i \qquad \Delta_{混}X = X_{混合物} - \sum_{i=1}^{C} X_{i,纯} = \sum_{i=1}^{C}\left({}^{m}X_i - X_{m,i}\right)n_i \qquad \sum_{i=1}^{C} n_i \mathrm{d}^{m}X_i = 0$$

$$P_i \equiv \alpha_i P_i^* \qquad \alpha_i \equiv \gamma_i\chi_i \qquad \mu_{i,液} = \mu_i{}^* + RT\ln\alpha_i \qquad \Delta_{混}G = \sum_{i=1}^{C} n_i RT\ln\gamma_i + \sum_{i=1}^{C} n_i RT\ln\chi_i$$

$$\Delta_{混}S = -RT\sum_{i=1}^{C} n_i\left(\frac{\partial\ln\gamma_i}{\partial T}\right)_{P,n} - \left(\sum_{i=1}^{C} n_i R\ln\gamma_i + \sum_{i=1}^{C} n_i R\ln\chi_i\right) = -\sum_{i=1}^{C} n_i\left(\frac{\partial(RT\ln\gamma_i)}{\partial T}\right)_{P,n} - \sum_{i=1}^{C} n_i R\ln\chi_i$$

$$\Delta_{混}X_i \equiv {}^{m}X_i - X_{m,i} \qquad \mathrm{d}(\ln\gamma_i)_n = \left(\frac{\partial\ln\gamma_i}{\partial T}\right)_{P,n}\mathrm{d}T + \left(\frac{\partial\ln\gamma_i}{\partial P}\right)_{T,n}\mathrm{d}P = -\frac{\Delta_{混}H_i}{RT^2}\mathrm{d}T + \frac{\Delta_{混}V_i}{RT}\mathrm{d}P$$

$$\mu_{i,(1)} = \mu_{i,(2)} = \mu_{i,(3)} = \cdots = \mu_{i,(p)} \qquad F = 2 + C - p \qquad l_{(左)}n_{(左)} = l_{(右)}n_{(右)} \qquad \frac{\chi_{i(液A)}}{\chi_{i(液B)}} = \frac{\gamma_{i(液B)}}{\gamma_{i(液A)}}$$

$$\frac{1}{\chi_{1(液B)}} = \frac{\gamma_{1(液B)}}{\gamma_{1(液A)}}\frac{n_{液A}}{n_1} + \frac{n_{液B}}{n_1} \qquad \gamma_{1(液B)} = \lim_{\chi_{1(液A)}\to 1}\frac{\chi_{1(液A)}}{\chi_{1(液B)}}\gamma_{1(液A)} = \frac{1}{\chi_{1(液B)}} \qquad \chi_{A(饱和液)} = \frac{1}{\gamma_{A(饱和液)}}$$

$$\mu_{A(溶液)} = \mu_{A(固)} + RT\ln\frac{P_A}{P_A^*} = \mu_{A(固)} + RT\ln\alpha_A = \mu_{A(饱和液)} + RT\ln\alpha_A \qquad K_{分配} = \frac{\chi_{溶质(液B)}}{\chi_{溶质(液A)}} = \frac{\gamma_{溶质(液A)}}{\gamma_{溶质(液B)}}$$

$$\left(P_{内} - P_{外}\right) = \frac{2F_{张力}}{r} \qquad \mathrm{d}G = -S\mathrm{d}T + V\mathrm{d}P + \sum_{i=1}^{C}\mu_{i(\infty)}\mathrm{d}n_i + \sum_{j=1}^{D}\sigma_j\mathrm{d}a_j \qquad \sigma_j \equiv \left(\frac{\partial G}{\partial a_j}\right)_{T,P,n,a\neq a_j}$$

$$\left(P_{内} - P_{外}\right) = \frac{2\sigma}{r} + \left(\frac{\partial\sigma}{\partial r}\right)_{T,P,n} \qquad h = \frac{2\sigma_{液-气}}{r_{管}\rho_{液}g} \qquad h = \frac{4\left(\sigma_{固-气} - \sigma_{固-液} - w_{液}\right)}{r_{管}\rho_{液}g} \qquad \theta = \frac{KC}{1+KC}$$

$$P^* = P^*_{(\infty)} \mathrm{e}^{\frac{V_\mathrm{m}}{RT}\left(\frac{\partial\sigma}{\partial r}\right)_{T,P}+\frac{2\sigma V_\mathrm{m}}{rRT}} \qquad \lim_{r\to 0}\left(\frac{\partial\sigma}{\partial r}\right)_{T,P} < 0 \qquad \chi_{饱和} = \chi_{饱和(\infty)} \mathrm{e}^{\frac{V_\mathrm{m}}{RT}\left(\frac{\partial\sigma}{\partial r}\right)_{T,P}+\frac{2\sigma V_\mathrm{m}}{rRT}} \qquad \varepsilon_{粒子} = \frac{\varepsilon^o_{粒子}}{\kappa_{介质}}\left(\frac{d}{d^o}\right)^{-\beta}$$

$$\mathrm{d}\xi = -\frac{\mathrm{d}n_i}{\nu_i} = \frac{\mathrm{d}n_j}{\nu_j} \qquad \left(\frac{\partial G}{\partial \xi}\right)_{T,P}\bigg|_{平衡} = 0 \qquad \left(\frac{\partial G}{\partial \xi}\right)_{T,P} = \Delta_r G \equiv \sum_{产物} \nu_j \mu_j - \sum_{反应物} \nu_i \mu_i = \Delta_r G^\ominus + RT\ln\Omega$$

$$\Delta_r G^\ominus \equiv \sum_{产物} \nu_j \mu_j^\ominus - \sum_{反应物} \nu_i \mu_i^\ominus \qquad \Omega \equiv \frac{\prod_{产物}(\alpha_j)^{\nu_j}}{\prod_{反应物}(\alpha_i)^{\nu_i}} \qquad K \equiv \frac{\prod_{产物}(\alpha_j)^{\nu_j}}{\prod_{反应物}(\alpha_i)^{\nu_i}}\Bigg|_{平衡} = \mathrm{e}^{-\frac{\Delta_r G^\ominus}{RT}} \qquad \left[\frac{\partial(\ln K)}{\partial T}\right]_P = \frac{\Delta_r H^\ominus}{RT^2}$$

$$\frac{P_{产物}}{P_{反应物}} \equiv \frac{\prod_{产物}(\chi_j)^{\nu_j}}{\prod_{反应物}(\chi_i)^{\nu_i}}\Bigg|_{平衡} = \frac{e^{-\frac{\Delta_r G^\ominus}{RT}}}{K_\gamma} \qquad K_\gamma = \frac{\prod_{产物}(\gamma_j)^{\nu_j}}{\prod_{反应物}(\gamma_i)^{\nu_i}}\Bigg|_{平衡} \qquad -\nu FE = \Delta_r G \qquad E^\ominus = -\frac{\Delta_r G^\ominus}{\nu F} = \frac{RT}{\nu F}\ln K$$

$$E = E^\ominus - \frac{RT}{\nu F}\ln\Omega \qquad \mathrm{d}S_{环} \equiv -\frac{\mathrm{d}q}{T_{环}} \qquad \overrightarrow{\Lambda_B} = \frac{\mathrm{d}B(x)}{\mathrm{d}x}\overrightarrow{x_o} \qquad f \equiv \frac{1}{a}\frac{\mathrm{d}H}{\mathrm{d}t} \qquad f = -k_f\Lambda = -k_f\frac{\mathrm{d}B}{\mathrm{d}x} \qquad \eta = \kappa\phi$$

$$\phi \equiv \left(\frac{P_{激发态}}{P_{E_T}}\right)^{-1} = \mathrm{e}^{\frac{\Delta E}{RT}} = \mathrm{e}^{-\frac{\left[1-0.35\left(\frac{V^o_\mathrm{m}}{V_{\mathrm{m},T}}\right)^2\right]E^o}{RT}} \qquad f_{z动量} = -\eta\frac{\mathrm{d}v_z}{\mathrm{d}x} \qquad f_{物质的量} = -D\frac{\mathrm{d}[i]}{\mathrm{d}x} \qquad D = \frac{kT}{3\pi d\eta}$$

$$\frac{\partial[i]}{\partial t} = D\frac{\partial^2[i]}{\partial x^2} \qquad \frac{\partial[i]}{\partial t} = \frac{2D}{r}\frac{\partial[i]}{\partial r} + D\frac{\partial^2[i]}{\partial r^2} \qquad \frac{\partial[i]}{\partial t} = -v\frac{\partial[i]}{\partial x} \qquad \frac{\partial[i]}{\partial t} = D\frac{\partial^2[i]}{\partial x^2} - v\frac{\partial[i]}{\partial x} \qquad \Delta x = \sqrt{2D\Delta t}$$

$$u = \frac{ze}{3\pi d\eta} \qquad t^o_{i,最短} \gg t^o_{典型} \Rightarrow L_i \not\subset L \qquad \Delta G_{垒} \equiv \left(H_{极大值态} - H_{反应态}\right) - T\left(S_{极大值态} - S_{反应态}\right)$$

$$\frac{P_{垒}}{P_{反应物}} \equiv \frac{\Omega_{垒}}{\Omega_{反应物}} = e^{-\frac{\Delta G^\ominus_{垒}}{RT}}\frac{1}{t^o_{上}} \qquad \frac{\Delta G^\ominus_{垒}}{RT} \to \infty \Rightarrow \text{“电子态}I\text{”} \not\subset \text{系统} \qquad t^o_{上} \to \infty \Rightarrow \text{“电子态}I\text{”} \not\subset \text{系统}$$

$$\ln k = \ln A - \frac{B}{T} \qquad E_\mathrm{a} = RT^2\frac{\mathrm{d}(\ln k)}{\mathrm{d}T} \qquad \mathcal{V} = \frac{1}{t^o_{上}t^o_{下}}e^{-\frac{\Delta G^\ominus_{垒}}{RT}}[\mathrm{A}][\mathrm{BC}] = \left(\frac{1}{t^o_{上}t^o_{下}}e^{\frac{\Delta_r S^\ominus_{垒}}{R}}\right)e^{-\frac{\Delta_r H^\ominus_{垒}}{RT}}[\mathrm{A}][\mathrm{BC}]$$

$$n_{步} = n_{电子态} - 1 \qquad \frac{\mathrm{d}[\mathrm{A}]_i}{\sum_{i=1}^n \mathrm{d}[\mathrm{A}]_i} = \frac{\mathcal{V}_i}{\mathcal{V}_{总}} = \frac{k_i}{\sum_{i=1}^n k_i} \qquad \frac{\mathrm{d}[\mathrm{A}]_{主}}{\mathrm{d}[\mathrm{A}]_{副}} = \frac{\mathcal{V}_{主}}{\mathcal{V}_{副}} = \frac{k_{主}[\mathrm{B}]}{k_{副}[\mathrm{C}]} \qquad \frac{\mathrm{d}[\mathrm{A}]_{主}}{\mathrm{d}[\mathrm{A}]} = \frac{\mathcal{V}_{主}}{\mathcal{V}_{总}} = \frac{k_{主}[\mathrm{B}]}{k_{主}[\mathrm{B}] + k_{副}[\mathrm{C}]}$$

$$\mathcal{V} = \frac{\mathrm{d}[(\mathrm{AB})]}{\mathrm{d}t} = 4\pi(r_A + r_B)(D_A + D_B)[\mathrm{A}][\mathrm{B}] \qquad \mathcal{V} = \frac{1}{V}\frac{\partial\xi}{\partial t} \qquad \mathcal{V} = k[\mathrm{A}]^\alpha[\mathrm{B}]^\beta[\mathrm{C}]^\gamma[\mathrm{D}]^\delta \qquad [\mathrm{A}] = [\mathrm{A}]_0 - kt$$

$$[\mathrm{A}] = [\mathrm{A}]_0\mathrm{e}^{-kt} \qquad \frac{1}{[\mathrm{A}]^{n-1}} - \frac{1}{[\mathrm{A}]_0^{n-1}} = (n-1)kt \qquad \mathcal{A} \equiv -\lg\frac{I}{I_0} = \varepsilon[i]d \qquad \varepsilon = \frac{n_{溶液}k\lg\mathrm{e}}{c}$$

$$\mathcal{V}_{t=0} = -\frac{1}{\nu_i}\frac{\mathrm{d}[i]}{\mathrm{d}t}\bigg|_{t=0} = -\frac{a_1}{\nu_i} \qquad \mathcal{V}_{t=0} = \frac{1}{\nu_j}\frac{\mathrm{d}[j]}{\mathrm{d}t}\bigg|_{t=0} = \frac{a_1}{\nu_j} \qquad \ln\mathcal{V} = \ln A - \frac{E_\mathrm{a}}{RT} + \alpha\ln[\mathrm{A}] + \beta\ln[\mathrm{B}] + \gamma\ln[\mathrm{C}]$$

$$[\mathrm{A}] = \frac{k_{正}}{k_{正} + k_{逆}}[\mathrm{A}]_0\mathrm{e}^{-\left(k_{正}+k_{逆}\right)t} + \frac{k_{逆}}{k_{正} + k_{逆}}[\mathrm{A}]_0 \qquad \tau^\ominus_{平衡} = \tau_{平衡} = \frac{\ln 2}{k_{正} + k_{逆}} \qquad \frac{P_{产物}}{P_{反应物}} = \frac{1 - \mathrm{e}^{-t\ln 2/\tau_{平衡}}}{\mathrm{e}^{-t\ln 2/\tau_{平衡}} + 1/K}$$

$$\mathcal{V} = \frac{k_1 k_2[\mathrm{E}]_0[\mathrm{S}]}{k_1' + k_1[\mathrm{S}]}$$