$\nu_A \cdot A \rightarrow P$ ~~pa~~ kinetikou 1. řádu

$\underline{\underline{n = 1}}$

$$r = \frac{d\xi}{dt} = k \cdot \left(A^0 + \nu_A \cdot \xi\right)^1$$

$\xi = x$

$A^0 = a$

$\nu_A = v$

subst: $\frac{dx}{dt} = k \cdot (a + v \cdot x)$

sep.: $k \cdot dt = \frac{1}{a + v \cdot x} dx$

int.: $k \cdot \int_0^t dt = \int_0^x \frac{1}{a + vx} dx$

w: $k \cdot t = \left[\frac{1}{v} \ln(a + vx)\right]_0^x$

$k \cdot t = \frac{1}{v} \cdot \left(\ln(a + vx) - \ln a\right)$

$vk \cdot t = \ln\left(\frac{a + v \cdot x}{a}\right)$.

r.subst: $\nu_A \cdot k \cdot t = \ln\left(\frac{A^0 + \nu_A \cdot \xi}{A^0}\right) = \ln \frac{A_t}{A_0}$

$\ln A_t = \ln A_0 - \nu_A k \cdot t$

$\frac{A_t}{A_0} = \exp(\nu_A k \cdot t)$

$\nu_A = -1$

$n = 1$ $\boxed{A_t = A_0 \cdot \exp(\nu_A k \cdot t)}$

$$\nu_A \cdot A \rightarrow P$$

$$\frac{d\xi}{dt} = k\cdot(A^0 + \nu_A\cdot\xi)^2$$

$\xi \equiv x$

$A^0 \equiv a$

$\nu_A \equiv v$

$$\frac{dx}{dt} = k\cdot(a + v\cdot x)^2$$

$$k\,dt = \frac{1}{(a+v\cdot x)^2}\,dx$$

$\int$ viz wolframalpha

$$k\int_0^t dt = \int_0^x \frac{1}{(a+v\cdot x)^2}\,dx$$

$$k\cdot t = \left[\frac{1}{v\cdot(a+v\cdot x)}\right]_0^x = \frac{1}{v\cdot(a+vx)} - \frac{1}{v\cdot a}$$

$$v\cdot k\cdot t = \frac{1}{a+vx} - \frac{1}{a}$$

$$\nu_A\cdot k\cdot t = \frac{1}{(A^0+\nu_A\cdot\xi)} - \frac{1}{A^0} = \frac{1}{A_t} - \frac{1}{A^0}$$

$n=2$ $$\boxed{\frac{1}{A_t} = \frac{1}{A^0} + \nu_A\cdot k\cdot t}$$

$\nu_A A \to P$ $\qquad$ $r = \frac{d\xi}{dt} = \frac{1}{\ }$

$$\frac{d\xi}{dt} = k \cdot (A^0 + \nu_A^{\circ} x)^3$$

$\xi \equiv x$

$A^0 \equiv a$

$\nu_A \equiv v$

subst. $\frac{dx}{dt} = k \cdot (a + v x)^3$

sep. $k \cdot dt = \frac{1}{(a+vx)^3} dx$

int: $k \cdot \int_0^t dt = \int_0^x \frac{1}{(a+vx)^3} dx$

$$k \cdot t = \left[\frac{1}{2v(a+vx)^2}\right]_0^x = \frac{1}{2v(a+vx)^2} - \frac{1}{2v(a)^2}$$

$$2vkt = \frac{1}{(a+vx)^2} - \frac{1}{a^2}$$

zpět: $2\nu_A k \cdot t = \frac{1}{(A_0 + \nu_A \xi)^2} - \frac{1}{A_0^2} = \frac{1}{(A_t)^2} - \frac{1}{A_0^2}$

(n=3) $\boxed{\frac{1}{A_t^2} = \frac{1}{A_0^2} - 2\nu_A \cdot k \cdot t}$

atd. pro $n > 3$

obecně:

$$\boxed{\frac{1}{A_t^{(n-1)}} = \frac{1}{(A^0)^{n-1}} + (n-1)\nu_A k t}$$