WolframAlpha computational intelligence

df(t) / dt = r f(t) (1 - f(t)/K), f(0) = p_0.

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Input interpretation:

$$\left\{\frac{\partial f(t)}{\partial t} = r\, f(t)\left(1 - \frac{f(t)}{K}\right),\ f(0) = p_0\right\}$$

ODE names:

Separable equation

$$-\frac{f'(t)}{\frac{f(t)(-K+f(t))}{K}} = r$$

Bernoulli's equation

$$f'(t) = r\, f(t) - \frac{r\, f(t)^2}{K}$$

Bernoulli's equation »

ODE classification:

first-order nonlinear ordinary differential equation

Alternate forms:

$$\left\{f'(t) = -\frac{r\, f(t)\,(f(t) - K)}{K},\ f(0) = p_0\right\}$$

$$\left\{f'(t) = r\left(f(t) - \frac{f}{K}\right),\ f(0) = p_0\right\}$$

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Expanded form:

$$\left\{f'(t) = r\, f(t) - \frac{r\, f(t)^2}{K},\ f(0) = p_0\right\}$$

Differential equation solution: Approximate form | Step-by-step solution

$$f(t) = \frac{\xi\, p_0\, e^{rt}}{\xi + p_0\left(e^{rt} - 1\right)}$$

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