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df(t) / dt = alpha f(t) + beta f(t)^2, f(0) = p_0.

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**Input interpretation:**

$$\left\{ \frac{\partial f(t)}{\partial t} = \alpha\, f(t) + \beta\, f(t)^2,\ f(0) = p_0 \right\}$$

**ODE names:**

Separable equation

$$\frac{f'(t)}{\alpha\, f(t) + \beta\, f(t)^2} = 1$$

Bernoulli's equation

$$f'(t) = \alpha\, f(t) + \beta\, f(t)^2$$

Bernoulli's equation »

**ODE classification:**

first-order nonlinear ordinary differential equation

**Alternate form:**

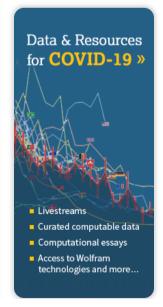$$\left\{ f(t)\,(\alpha + \beta\, f(t)) = f'(t),\ f(0) = p_0 \right\}$$

**Differential equation solution:**

Approximate form      ☑ Step-by-step solution

$$f(t) = \frac{\alpha\, p_0\, e^{\alpha t}}{\alpha - \beta\, p_0\, (e^{\alpha t} - 1)}$$

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**=** y' = 1/(1 + x + y)        **=** x y y' = lnx

**=** y' + 2 y = x             **=** y' = x^2 y + x y^2

**=** y y' + y y" = y' y"

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