



Exact Solutions > Ordinary Differential Equations > First-Order Ordinary Differential Equations > Bernoulli Equation

4. $g(x)y'_x = f_1(x)y + f_n(x)y^n$.

Bernoulli equation. Here, n is an arbitrary number.

1°. For $n \neq 1$, the substitution $w(x) = y^{1-n}$ leads to a linear equation:

$$g(x)w'_x = (1-n)f_1(x)w + (1-n)f_n(x).$$

2°. Solution:

$$y^{1-n} = Ce^F + (1-n)e^F \int e^{-F} \frac{f_n(x)}{g(x)} dx, \quad \text{where } F(x) = (1-n) \int \frac{f_1(x)}{g(x)} dx,$$

C is an arbitrary constant.

References

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