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9.  $y'_x = y^2 + x f(x)y + f(x)$ .

**Riccati equation, special case 3.**

Particular solution:  $y_0 = -1/x$ .

The general solution can be written as:

$$y = -\frac{1}{x} + \Phi(x) \left[ C - \int \Phi(x) dx \right]^{-1}, \quad \text{where } \Phi(x) = \frac{1}{x^2} \exp \left[ \int x f(x) dx \right],$$

$C$  is an arbitrary constant.

### Reference

**Polyanin, A. D. and Zaitsev, V. F.**, *Handbook of Exact Solutions for Ordinary Differential Equations, 2nd Edition*, Chapman & Hall/CRC, Boca Raton, 2003.

Riccati Equation, Special Case 3

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