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$$19. \quad y'_x = f(x)y^2 + a\lambda e^{\lambda x} - a^2 e^{2\lambda x} f(x).$$

**Riccati equation, special case 13.**

Particular solution:  $y_0 = ae^{\lambda x}$ .

The general solution can be written as:

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

$C$  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.

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