

First-Order Partial Differential Equations > Nonlinear Equations > Section 3.1

10.
$$\frac{\partial w}{\partial x} + a \left(\frac{\partial w}{\partial y}\right)^2 + b \frac{\partial w}{\partial y} = f(x)w + g(x)$$
.

Complete integral:

$$w = (C_1 y + C_2) F(x) + F(x) \int \left[g(x) - a C_1^2 F^2(x) - b C_1 F(x) \right] \frac{dx}{F(x)}, \qquad F(x) = \exp \left[\int f(x) \, dx \right],$$

where C_1 and C_2 are arbitrary constants.

Reference

Polyanin, A. D., Zaitsev, V. F., and Moussiaux, A., Handbook of First Order Partial Differential Equations, Taylor & Francis, London, 2002.

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http://eqworld.ipmnet.ru/en/solutions/fpde/fpde3110.pdf