



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

$$9. \quad \frac{\partial w}{\partial x} + a \left(\frac{\partial w}{\partial y} \right)^2 + b \frac{\partial w}{\partial y} = f(x)y + g(x).$$

Complete integral:

$$w = \varphi(x)y + \int [g(x) - a\varphi^2(x) - b\varphi(x)] dx + C_1, \quad \text{where} \quad \varphi(x) = \int f(x) dx + C_2,$$

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.