



First-Order Partial Differential Equations > Quasilinear Equations > Section 2.1

1.
$$\frac{\partial w}{\partial x} + a \frac{\partial w}{\partial y} = f(x)w + g(x)w^k.$$

General solution:

$$w^{1-k} = F(x)\Phi(y - ax) + (1 - k)F(x) \int \frac{g(x)}{F(x)} dx, \text{ where } F(x) = \exp \left[(1 - k) \int f(x) dx \right],$$

$\Phi(u)$ is an arbitrary function.

Reference

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