

First-Order Partial Differential Equations > Quasilinear Equations > Section 2.2

4.
$$\frac{\partial w}{\partial x} + [f(w) + ax] \frac{\partial w}{\partial y} = 0$$
.

General solution:

$$y = xf(w) + \frac{1}{2}ax^2 + \Phi(w),$$

where $\Phi(w)$ 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.

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http://eqworld.ipmnet.ru/en/solutions/fpde/fpde2204.pdf