

First-Order Partial Differential Equations > Quasilinear Equations > Section 2.3

2.
$$\frac{\partial w}{\partial x} + aw \frac{\partial w}{\partial y} = f(y)$$
.

General solution

$$x=\pm\int_{y_0}^y \frac{dz}{\sqrt{2aF(z)-2au}} + \Phi(u), \quad \text{where} \quad F(y)=\int f(y)\,dy, \quad u=F(y)-\frac{1}{2}aw^2,$$

 $\Phi(u)$ 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.

Copyright © 2004 Andrei D. Polyanin

http://eqworld.ipmnet.ru/en/solutions/fpde/fpde2302.pdf