



First-Order Partial Differential Equations > Nonlinear Equations > Section 3.3

4. 
$$\frac{\partial w}{\partial x} + f\left(\frac{\partial w}{\partial y}\right) = g(x)w + h(x).$$

Complete integral:

$$w = (C_1 y + C_2)\varphi(x) + \varphi(x) \int [h(x) - f(C_1\varphi(x))] \frac{dx}{\varphi(x)}, \quad \text{where } \varphi(x) = \exp\left[\int g(x) dx\right],$$

$C_1$  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.