

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:

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

 $C_1$  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.

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http://eqworld.ipmnet.ru/en/solutions/fpde/fpde3304.pdf