

First-Order Partial Differential Equations > Linear Equations > Section 1.3

3. 
$$a\frac{\partial w}{\partial x} + b\frac{\partial w}{\partial y} = [f(x) + g(y)]w$$
.

General solution:

$$w = \exp\left[\frac{1}{a} \int f(x) \, dx + \frac{1}{b} \int g(y) \, dy\right] \Phi(bx - ay),$$

where  $\Phi(u)$  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.

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http://eqworld.ipmnet.ru/en/solutions/fpde/fpde1303.pdf