

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

4. 
$$\frac{\partial w}{\partial x} + a \frac{\partial w}{\partial y} = f(x, y)w$$
.

General solution:

$$w = \exp\left[\int_{x_0}^x f(t, y - ax + at) dt\right] \Phi(y - ax),$$

where  $\Phi(u)$  is an arbitrary function,  $x_0$  may be taken arbitrary.

## 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/fpde1304.pdf