



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.