



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

$$9. \quad f(x) \frac{\partial w}{\partial x} + g(y) \frac{\partial w}{\partial y} = [h_1(x) + h_2(y)] w.$$

General solution:

$$w = \exp \left[\int \frac{h_1(x)}{f(x)} dx + \int \frac{h_2(y)}{g(y)} dy \right] \Phi \left(\int \frac{dx}{f(x)} dx - \int \frac{dy}{g(y)} dy \right),$$

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.