



First-Order Partial Differential Equations > Linear Equations > Section 1.2

10. 
$$\frac{\partial w}{\partial x} + [f(x) + g(x)e^{\lambda y}] \frac{\partial w}{\partial y} = h(x).$$

General solution:

$$w = \int h(x) dx + \Phi(u),$$

where  $\Phi(u)$  is an arbitrary function,

$$u = e^{-\lambda y} F(x) + \lambda \int g(x) F(x) dx, \quad F(x) = \exp \left[ \lambda \int f(x) dx \right].$$

### Reference

**Polyanin, A. D., Zaitsev, V. F., and Moussiaux, A.,** *Handbook of First Order Partial Differential Equations*, Taylor & Francis, London, 2002.