

First-Order Partial Differential Equations > Linear Equations > Section 1.1

3. 
$$\frac{\partial w}{\partial x} + [f(x)e^{\lambda y} + g(x)]\frac{\partial w}{\partial y} = 0$$
.

- $1^{\circ}. \ \ \text{Principal integral:} \ \ \Xi = e^{-\lambda y}E + \lambda \int f(x)E \ dx, \ \ \text{where} \ E = \exp \left[\lambda \int g(x) \ dx\right].$
- $2^{\circ}$ . General solution:  $w = \Phi(\Xi)$ , where  $\Phi(\Xi)$  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/fpde1103.pdf