

First-Order Partial Differential Equations > Nonlinear Equations > Section 3.3

13.
$$F_1\left(x,\frac{\partial w}{\partial x}\right) + e^{\lambda w}F_2\left(y,\frac{\partial w}{\partial y}\right) = 0.$$

Complete integral:

$$w(x, y) = \varphi(x) + \psi(y).$$

The functions $\varphi = \varphi(x)$ and $\psi = \psi(y)$ are determined by solving the ordinary differential equations

$$e^{-\lambda\varphi}F_1\big(x,\varphi_x'\big)=C, \quad e^{\lambda\psi}F_2\big(y,\psi_y'\big)=-C,$$

where C is an arbitrary constant.

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/fpde3313.pdf