

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

14. 
$$F_1\left(x, \frac{1}{w} \frac{\partial w}{\partial x}\right) + F_2\left(y, \frac{1}{w} \frac{\partial w}{\partial y}\right) = k \ln w$$
.

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

$$F_1(x, \varphi_x'/\varphi) - k \ln \varphi = C, \quad F_2(y, \psi_y'/\psi) - k \ln \psi = -C,$$

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/fpde3314.pdf