

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

24. 
$$F\left(ax+by, \frac{\partial w}{\partial x}, \frac{\partial w}{\partial y}, w-x\frac{\partial w}{\partial x}-y\frac{\partial w}{\partial y}\right)=0.$$

Complete integral:

$$w = C_1 x + C_2 y + \varphi(\xi), \quad \xi = ax + by,$$

where  $C_1$  and  $C_2$  are arbitrary constants, and the function  $\varphi(\xi)$  is determined by solving the nonlinear ordinary differential equation  $F(\xi, a\varphi'_{\xi} + C_1, b\varphi'_{\xi} + C_2, \varphi - \xi\varphi'_{\xi}) = 0$ .

## 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/fpde3324.pdf