



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

$$10. \quad F_1\left(x, \frac{\partial w}{\partial x}\right) = F_2\left(y, \frac{\partial w}{\partial y}\right).$$

A separable equation.

Complete integral:

$$w = \varphi(x) + \psi(y) + C_1,$$

where the functions $\varphi = \varphi(x)$ and $\psi = \psi(y)$ are determined from the ordinary differential equations

$$F_1(x, \varphi'_x) = C_2, \quad F_2(y, \psi'_y) = C_2,$$

C_1 and C_2 are arbitrary constants.

References

Kamke, E., *Differentialgleichungen: Lösungsmethoden und Lösungen, II, Partielle Differentialgleichungen Erster Ordnung für eine gesuchte Funktion*, Akad. Verlagsgesellschaft Geest & Portig, Leipzig, 1965.

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