



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

$$21. \quad F\left(ax + by + cw, \frac{\partial w}{\partial x}, \frac{\partial w}{\partial y}\right) = 0.$$

For $c = 0$, see equation 3.3.19. If $c \neq 0$, then the substitution $cu = ax + by + cw$ leads to an equation of the form 3.3.20: $F\left(cu, \frac{\partial u}{\partial x} - \frac{a}{c}, \frac{\partial u}{\partial y} - \frac{b}{c}\right) = 0$.

Reference

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