

Exact Solutions > Ordinary Differential Equations > Higher-Order Nonlinear Ordinary Differential Equations > Equation Does not Depend on y Explicitly

7.
$$F(x, y'_x, y''_{xx}, \ldots, y_x^{(n)}) = 0$$
.

The equation does not depend on y explicitly. The substitution $w(x) = y'_x$ leads to an (n-1)st-order equation:

$$F(x, w, w'_x, \dots, w_x^{(n-1)}) = 0.$$

References

Kamke, E., Differentialgleichungen: Lösungsmethoden und Lösungen, I, Gewöhnliche Differentialgleichungen, B. G. Teubner, Leipzig, 1977.

 $\label{eq:continuous} \textbf{Polyanin, A. D. and Zaitsev, V.F.,} \ \ \textit{Handbook of Exact Solutions for Ordinary Differential Equations, 2nd Edition} \ , \textbf{Chapman & Hall/CRC, Boca Raton, 2003.}$

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