

12.
$$F(x^m e^{\alpha y}, xy'_x, x^2 y''_{xx}, \dots, x^n y_x^{(n)}) = 0.$$

Equation invariant under "dilatation—translation" transformation. The transformation $z=x^me^{\alpha y}, \ w=xy_x'$ leads to an (n-1)st-order equation.

Reference

Polyanin, A. D. and Zaitsev, V. F., *Handbook of Exact Solutions for Ordinary Differential Equations, 2nd Edition,* Chapman & Hall/CRC, Boca Raton, 2003.

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