

$$\textbf{48.} \quad [f(e^{\alpha x}y^m) + mxg(e^{\alpha x}y^m)]y_x' = y[h(e^{\alpha x}y^m) - \alpha xg(e^{\alpha x}y^m)].$$

The substitution $t = e^{\alpha x} y^m$ leads to a linear equation with respect to x = x(t):

$$t[\alpha f(t) + mh(t)]x_t' = mg(t)x + f(t).$$

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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