

47.
$$x[f(x^ne^{\alpha y}) + \alpha yg(x^ne^{\alpha y})]y_x' = h(x^ne^{\alpha y}) - nyg(x^ne^{\alpha y}).$$

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

$$t[nf(t) + \alpha h(t)]y'_t = -ng(t)y + h(t).$$

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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