



44. $y'_x = -\frac{\alpha}{m}y + y^k f(x)g(e^{\alpha x}y^m).$

The substitution $z = e^{\alpha x}y^m$ leads to a separable equation:

$$z'_x = m \exp\left[\frac{\alpha}{m}(1-k)x\right] f(x)z^{\frac{k+m-1}{m}} g(z).$$

Reference

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