



37. $yy''_{xx} - n(y'_x)^2 + f(x)y^2 + g(x)y^{n+1} = 0.$

The substitution $w = y^{1-n}$ leads to a nonhomogeneous linear equation:

$$w''_{xx} + (1-n)f(x)w + (1-n)g(x) = 0.$$

Reference

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