



50. $gy''_{xx} + \frac{1}{2}g'_x y'_x = f(y)h(y'_x \sqrt{g}), \quad g = g(x).$

The substitution $w(y) = y'_x \sqrt{g}$ leads to a first-order separable equation: $ww'_y = f(y)h(w).$

Reference

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