



42.  $y''_{xx} + a(y'_x)^2 - \frac{1}{2}y'_x = e^x f(y).$

The substitution  $w(y) = e^{-x}(y'_x)^2$  leads to a first-order linear equation:  $w'_y + 2aw = 2f(y).$

### Reference

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