

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.

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http://eqworld.ipmnet.ru/en/solutions/ode/ode0342.pdf