



50. $y''_{xx} - f'_x y'_x - a^2 e^{2f} y = 0, \quad f = f(x).$

Solution:

$$y = C_1 \exp\left(a \int e^f dx\right) + C_2 \exp\left(-a \int e^f dx\right),$$

where C_1 and C_2 are arbitrary constants.

Reference

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