

27.
$$y''_{xx} + ae^{\lambda x}y = 0$$
, $\lambda \neq 0$.

Solution:

$$y = C_1 J_0(z) + C_2 Y_0(z), \quad z = 2\lambda^{-1} \sqrt{a} e^{\lambda x/2},$$

where C_1 and C_2 are arbitrary constants, $J_0(z)$ and $Y_0(z)$ are the Bessel functions.

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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