

31.
$$y_{xx}^{"} - ay_x^{'} + be^{2ax}y = 0$$
.

The substitution $\xi = e^{ax}$ leads to a constant coefficient linear equation of the form 2.1: $y_{\xi\xi}'' + ba^{-2}y = 0$.

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/ode0231.pdf