**7.** $\dfrac{\partial w}{\partial t} = a\dfrac{\partial}{\partial x}\left(e^{\lambda w}\dfrac{\partial w}{\partial x}\right).$

*Heat equation with a exponential nonlinearity.*

1°. Solutions:

$$w(x,t) = \frac{2}{\lambda}\ln\left(\frac{\pm x + A}{\sqrt{B-2at}}\right),$$

$$w(x,t) = \frac{1}{\lambda}\ln\frac{A + Bx - Cx^2}{D + 2aCt},$$

where $A$, $B$, $C$, and $D$ are arbitrary constants.

2°. There are solutions of the following forms:

$$w(x,t) = F(z), \quad z = kx + \beta t \qquad \text{traveling-wave solution;}$$

$$w(x,t) = G(\xi), \quad \xi = xt^{-1/2} \qquad \text{self-similar solution;}$$

$$w(x,t) = H(\eta) + 2kt, \quad \eta = xe^{-k\lambda t};$$

$$w(x,t) = U(\zeta) - \lambda^{-1}\ln t, \quad \zeta = x + k\ln t,$$

where $k$ and $\beta$ are arbitrary constants.

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