2. $\dfrac{\partial u}{\partial t} = \dfrac{a}{x^n}\dfrac{\partial}{\partial x}\left(x^n \dfrac{\partial u}{\partial x}\right) + e^{\lambda u} f(\lambda u - \sigma w), \qquad \dfrac{\partial w}{\partial t} = \dfrac{b}{x^n}\dfrac{\partial}{\partial x}\left(x^n \dfrac{\partial w}{\partial x}\right) + e^{\sigma w} g(\lambda u - \sigma w).$

Solution:

$$u = y(\xi) - \frac{1}{\lambda}\ln(C_1 t + C_2), \qquad w = z(\xi) - \frac{1}{\sigma}\ln(C_1 t + C_2), \qquad \xi = \frac{x}{\sqrt{C_1 t + C_2}},$$

where C_1 and C_2 are arbitrary constants, and the functions $y = y(\xi)$ and $z = z(\xi)$ are determined by the system of ordinary differential equations

$$a\xi^{-n}(\xi^n y'_\xi)'_\xi + \frac{1}{2}C_1 \xi y'_\xi + \frac{C_1}{\lambda} + e^{\lambda y} f(\lambda y - \sigma z) = 0,$$
$$b\xi^{-n}(\xi^n z'_\xi)'_\xi + \frac{1}{2}C_1 \xi z'_\xi + \frac{C_1}{\sigma} + e^{\sigma z} g(\lambda y - \sigma z) = 0.$$

