8. $\dfrac{\partial u}{\partial t}=\dfrac{a}{x^n}\dfrac{\partial}{\partial x}\left(x^n\dfrac{\partial u}{\partial x}\right)+uf(x,u^kw^m),\qquad \dfrac{\partial w}{\partial t}=\dfrac{b}{x^n}\dfrac{\partial}{\partial x}\left(x^n\dfrac{\partial w}{\partial x}\right)+wg(x,u^kw^m).$

Multiplicative separable solution:

$$u=e^{-m\lambda t}y(x),\qquad w=e^{k\lambda t}z(x),$$

where λ is an arbitrary constant and the functions $y=y(x)$ and $z=z(x)$ are determined by the system of ordinary differential equations

$$ax^{-n}(x^ny'_x)'_x+m\lambda y+yf(x,y^kz^m)=0,$$
$$bx^{-n}(x^nz'_x)'_x-k\lambda z+zg(x,y^kz^m)=0.$$

