9. $\quad ax\dfrac{\partial u}{\partial x} + ay\dfrac{\partial u}{\partial y} = \dfrac{\partial^2 u}{\partial x^2} + \dfrac{\partial^2 u}{\partial y^2} - f(u, w), \quad ax\dfrac{\partial w}{\partial x} + ay\dfrac{\partial w}{\partial y} = \dfrac{\partial^2 w}{\partial x^2} + \dfrac{\partial^2 w}{\partial y^2} - g(u, w).$

Solution:

$$u(x, y) = U(z), \qquad w(x, y) = W(z), \qquad z = k_1 x + k_2 y,$$

where k_1 and k_2 are arbitrary constants, and the functions $U = U(z)$ and $W = W(z)$ satisfy the system of ordinary differential equations

$$azU' = (k_1^2 + k_2^2)U'' - f(U, W), \qquad azW' = (k_1^2 + k_2^2)W'' - g(U, W).$$