



Systems of Ordinary Differential Equations > Nonlinear Systems of Two Equations

2.  $x'_t = e^{\lambda x} F(x, y), \quad y'_t = g(y)F(x, y).$

Solution:

$$x = \varphi(y), \quad \int \frac{dy}{g(y)F(\varphi(y), y)} = t + C_2,$$

where

$$\varphi(y) = \begin{cases} -\frac{1}{\lambda} \ln \left[ C_1 - \lambda \int \frac{dy}{g(y)} \right] & \text{if } \lambda \neq 0, \\ C_1 + \int \frac{dy}{g(y)} & \text{if } \lambda = 0, \end{cases}$$

$C_1$  and  $C_2$  are arbitrary constants.