

$$\begin{aligned}
& \text{restart} \\
& \text{Ecua} := x + y \cdot y' + x^2 \cdot y' - x \cdot y = 0 \\
& \text{Ecua} := x + y(x) \left(\frac{d}{dx} y(x) \right) + x^2 \left(\frac{d}{dx} y(x) \right) - x y(x) = 0 \quad (1) \\
& \text{with(DEtools)} : \\
& \text{odeadvisor(Ecua)} \\
& \quad [_{\text{rational}}, [_{\text{1st_order}}, [_{\text{with_symmetry_}}[F(x)*G(y), 0]], [_{\text{Abel}}, 2\text{nd type, class A}]]] \quad (2) \\
& \text{intfactor(Ecua)} \\
& \quad \frac{1}{(y(x) - 1)^3} \quad (3) \\
& \text{EcuaDos} := \text{isolate(Ecua, diff(y(x), x))} \\
& \text{EcuaDos} := \frac{d}{dx} y(x) = \frac{x y(x) - x}{x^2 + y(x)} \quad (4) \\
& M := x - x \cdot y \\
& M := -x y + x \quad (5) \\
& N := x^2 + y \\
& N := x^2 + y \quad (6) \\
& \text{DerMy} := \text{diff}(M, y) \\
& \text{DerMy} := -x \quad (7) \\
& \text{DerNx} := \text{diff}(N, x) \\
& \text{DerNx} := 2 x \quad (8) \\
& \text{EcuaFIy} := G(y) \cdot \text{DerMy} + M \cdot \text{diff}(G(y), y) = G(y) \cdot \text{DerNx} \\
& \text{EcuaFIy} := -G(y) x + (-x y + x) \left(\frac{d}{dy} G(y) \right) = 2 G(y) x \quad (9) \\
& \text{FIy} := \text{subs}(_C1 = 1, \text{dsolve(EcuaFIy)}) \\
& \text{FIy} := G(y) = \frac{1}{(y - 1)^3} \quad (10) \\
& \text{MM} := \text{rhs(FIy)} \cdot M \\
& \text{MM} := \frac{-x y + x}{(y - 1)^3} \quad (11) \\
& \text{NN} := \text{rhs(FIy)} \cdot N \\
& \text{NN} := \frac{x^2 + y}{(y - 1)^3} \quad (12) \\
& \text{EcuaExacta} := \text{MM} + \text{NN} \cdot y' = 0 \\
& \text{EcuaExacta} := \frac{-x y + x}{(y - 1)^3} + \frac{(x^2 + y) \left(\frac{d}{dx} y(x) \right)}{(y - 1)^3} = 0 \quad (13) \\
& \text{EcuaExactaDos} := \frac{-x y(x) + x}{(y(x) - 1)^3} + \frac{(x^2 + y(x)) \left(\frac{d}{dx} y(x) \right)}{(y(x) - 1)^3}; \text{with(DEtools)} : \\
& \quad (14)
\end{aligned}$$

$$EcuaExactaDos := \frac{-x y(x) + x}{(y(x) - 1)^3} + \frac{(x^2 + y(x)) \left(\frac{d}{dx} y(x) \right)}{(y(x) - 1)^3} \quad (14)$$

> odeadvisor(EcuaExactaDos)
[_exact, _rational, [_1st_order, _with_symmetry_[F(x)*G(y),0]], [_Abel, 2nd type, class A]] (15)

> DerMMx := simplify(diff(MM, y))

$$DerMMx := \frac{2x}{(y-1)^3} \quad (16)$$

> DerNNx := diff(NN, x)

$$DerNNx := \frac{2x}{(y-1)^3} \quad (17)$$

> IntMMx := simplify(int(MM, x))

$$IntMMx := -\frac{1}{2} \frac{x^2}{(y-1)^2} \quad (18)$$

> SolGral := IntMMx + int((NN - diff(IntMMx, y)), y) = _CI

$$SolGral := -\frac{1}{y-1} - \frac{1}{2} \frac{x^2 + 1}{(y-1)^2} = _CI \quad (19)$$

> SolGralFinal := -\frac{1}{y(x)-1} - \frac{1}{2} \frac{x^2 + 1}{(y(x)-1)^2} = _CI

$$SolGralFinal := -\frac{1}{y(x)-1} - \frac{1}{2} \frac{x^2 + 1}{(y(x)-1)^2} = _CI \quad (20)$$

> DerSolGral := simplify(isolate(diff(SolGralFinal, x), diff(y(x), x)))

$$DerSolGral := \frac{d}{dx} y(x) = \frac{x(y(x)-1)}{x^2 + y(x)} \quad (21)$$

> EcuaDos

$$\frac{d}{dx} y(x) = \frac{x y(x) - x}{x^2 + y(x)} \quad (22)$$