

$$\begin{aligned}
& \text{restart} \\
& \text{Ecua} := (y^2 + x \cdot y^2) \cdot y' + x^2 - y \cdot x^2 = 0 \\
& \quad \text{Ecua} := (y(x)^2 + x y(x)^2) \left(\frac{d}{dx} y(x) \right) + x^2 - y(x) x^2 = 0 \quad (1) \\
& M := \text{factor}(x^2 - y x^2) \\
& \quad M := -x^2 (y - 1) \quad (2) \\
& N := \text{factor}(y^2 + x y^2) \\
& \quad N := y^2 (x + 1) \quad (3) \\
& \text{with(DEtools):} \\
& \text{odeadvisor(Ecua)} \\
& \quad [_{\text{separable}}] \quad (4) \\
& P := -x^2; Q := y - 1; R := x + 1; S := y^2 \\
& \quad P := -x^2 \\
& \quad Q := y - 1 \\
& \quad R := x + 1 \\
& \quad S := y^2 \quad (5) \\
& \text{SolGral} := \text{int}\left(\frac{P}{R}, x\right) + \text{int}\left(\frac{S}{Q}, y\right) = _CI \\
& \quad \text{SolGral} := -\frac{x^2}{2} + x - \ln(x + 1) + \frac{y^2}{2} + y + \ln(y - 1) = _CI \quad (6) \\
& \text{SolFinal} := -\frac{x^2}{2} + x - \ln(x + 1) + \frac{y(x)^2}{2} + y(x) + \ln(y(x) - 1) = _CI \\
& \quad \text{SolFinal} := -\frac{x^2}{2} + x - \ln(x + 1) + \frac{y(x)^2}{2} + y(x) + \ln(y(x) - 1) = _CI \quad (7) \\
& \text{DerSolGral} := \text{simplify}(\text{isolate}(\text{diff}(\text{SolFinal}, x), \text{diff}(y(x), x))) \\
& \quad \text{DerSolGral} := \frac{d}{dx} y(x) = \frac{x^2 (y(x) - 1)}{(x + 1) y(x)^2} \quad (8) \\
& \text{DerEcua} := \text{isolate}(\text{Ecua}, \text{diff}(y(x), x)) \\
& \quad \text{DerEcua} := \frac{d}{dx} y(x) = \frac{-x^2 + y(x) x^2}{y(x)^2 + x y(x)^2} \quad (9) \\
& \text{Comprobar} := \text{simplify}(\text{rhs}(\text{DerEcua}) - \text{rhs}(\text{DerSolGral}) = 0) \\
& \quad \text{Comprobar} := 0 = 0 \quad (10) \\
& \text{SolAlternativa} := \text{dsolve}(\text{Ecua}) \\
& \quad \text{SolAlternativa} := y(x) = e^{\text{RootOf}(-e^2 _Z + x^2 - 4 e _Z + 2 \ln(x + 1) + 2 c_1 - 2 _Z - 2 x - 3)} + 1 \quad (11) \\
& \text{SolComplementaria} := \text{simplify}(\text{isolate}(\text{SolFinal}, y(x))) \\
& \quad \text{SolComplementaria} := y(x) = \left(x^{\text{RootOf}(x^2 e^2 _Z + 2 c_1 e^2 _Z + 2 _Z e^2 _Z - 2 x e^2 _Z - 3 e^2 _Z - 4 x e _Z - x^2 - 4 e _Z - 2 x - 1)} + 1 \right) \quad (12)
\end{aligned}$$

$$e^{-\text{RootOf}\left(x^2 e^Z + 2 c_1 e^Z + 2 Z e^Z - 2 x e^Z - 3 e^Z - 4 x e^Z - x^2 - 4 e^Z - 2 x - 1\right)}$$

> restart

> $Ecua := \exp(y) \cdot (1 + x^2) \cdot y' - 2 \cdot x \cdot (1 + \exp(y)) = 0$

$$Ecua := e^{y(x)} (x^2 + 1) \left(\frac{d}{dx} y(x) \right) - 2 x (1 + e^{y(x)}) = 0 \quad (13)$$

> with(DEtools):

> odeadvisor(Ecua)

[_separable] (14)

> $M := -2 \cdot x \cdot (1 + \exp(y))$

$$M := -2 x (1 + e^y) \quad (15)$$

> $N := \exp(y) \cdot (1 + x^2)$

$$N := e^y (x^2 + 1) \quad (16)$$

> $P := -2 \cdot x; Q := 1 + \exp(y); R := (x^2 + 1); S := e^y$

$$P := -2 x$$

$$Q := 1 + e^y$$

$$R := x^2 + 1$$

$$S := e^y$$

(17)

> $SolGral := \int \left(\frac{P}{R}, x \right) + \int \left(\frac{S}{Q}, y \right) = _CI$

$$SolGral := -\ln(x^2 + 1) + \ln(1 + e^y) = _CI \quad (18)$$

> $SolFinal := -\ln(x^2 + 1) + \ln(1 + e^{y(x)}) = _CI$

$$SolFinal := -\ln(x^2 + 1) + \ln(1 + e^{y(x)}) = _CI \quad (19)$$

> $DerSolFinal := \text{isolate}(\text{diff}(SolFinal, x), \text{diff}(y(x), x))$

$$DerSolFinal := \frac{d}{dx} y(x) = \frac{2 x (1 + e^{y(x)})}{e^{y(x)} (x^2 + 1)} \quad (20)$$

> $DerEcua := \text{isolate}(Ecua, \text{diff}(y(x), x))$

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

> $Comprobar := \text{simplify}(\text{rhs}(DerEcua) - \text{rhs}(DerSolFinal)) = 0$

$$Comprobar := 0 = 0 \quad (22)$$

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