

$$\begin{aligned}
 &> \text{restart} \\
 &> \text{Ecuacion} := 3 \cdot \exp(x) \cdot \tan(y(x)) + (2 - \exp(x)) \cdot \sec(y(x))^2 \cdot \text{diff}(y(x), x) = 0 \\
 &\quad \text{Ecuacion} := 3 e^x \tan(y(x)) + (2 - e^x) \sec(y(x))^2 \left( \frac{d}{dx} y(x) \right) = 0 \tag{1}
 \end{aligned}$$

$$\begin{aligned}
 &> \text{with(DEtools)} : \\
 &> \text{odeadvisor(Ecuacion)} \\
 &\quad \text{[_separable]} \tag{2}
 \end{aligned}$$

$$\begin{aligned}
 &> M := 3 e^x \tan(y) \\
 &\quad M := 3 e^x \tan(y) \tag{3}
 \end{aligned}$$

$$\begin{aligned}
 &> N := (2 - e^x) \sec(y)^2 \\
 &\quad N := (2 - e^x) \sec(y)^2 \tag{4}
 \end{aligned}$$

$$\begin{aligned}
 &> P := 3 e^x; Q := \tan(y); R := (2 - e^x); S := \sec(y)^2 \\
 &\quad P := 3 e^x \\
 &\quad Q := \tan(y) \\
 &\quad R := 2 - e^x \\
 &\quad S := \sec(y)^2 \tag{5}
 \end{aligned}$$

$$\begin{aligned}
 &> \text{Solucion} := \text{int}\left(\frac{P}{R}, x\right) + \text{int}\left(\frac{S}{Q}, y\right) = \_CI \\
 &\quad \text{Solucion} := -3 \ln(2 - e^x) + \ln(\tan(y)) = \_CI \tag{6}
 \end{aligned}$$

$$\begin{aligned}
 &> \text{SolucionGeneral} := \text{simplify}(\exp(\text{lhs}(\text{Solucion}))) = \_C100 \\
 &\quad \text{SolucionGeneral} := -\frac{\tan(y)}{(-2 + e^x)^3} = \_C100 \tag{7}
 \end{aligned}$$

$$\begin{aligned}
 &> \text{SolGralDos} := \text{lhs}(\text{SolucionGeneral}) \cdot (-2 + e^x)^3 = \text{rhs}(\text{SolucionGeneral}) \cdot (-2 + e^x)^3 \\
 &\quad \text{SolGralDos} := -\tan(y) = \_C100 (-2 + e^x)^3 \tag{8}
 \end{aligned}$$

$$\begin{aligned}
 &> \text{SolGralFinal} := -\text{lhs}(\text{SolGralDos}) + \tan(y) + (\text{rhs}(\text{SolGralDos}) + \tan(y)) = 0 \\
 &\quad \text{SolGralFinal} := 3 \tan(y) + \_C100 (-2 + e^x)^3 = 0 \tag{9}
 \end{aligned}$$

$$\begin{aligned}
 &> \\
 &\text{Para comprobar} \\
 &> \text{Sol} := \text{dsolve(Ecuacion)} \\
 &\text{Sol} := y(x) \tag{10}
 \end{aligned}$$

$$\begin{aligned}
 &= \frac{1}{2} \left( \arctan \left( (2 c_l (e^{3x} - 6 e^{2x} + 12 e^x - 8)) / (e^{6x} c_l^2 - 12 e^{5x} c_l^2 + 60 e^{4x} c_l^2 \right. \right. \\
 &\quad \left. \left. - 160 e^{3x} c_l^2 + 240 e^{2x} c_l^2 - 192 e^x c_l^2 + 64 c_l^2 + 1) \right), \right. \\
 &\quad \left. - \frac{e^{6x} c_l^2 - 12 e^{5x} c_l^2 + 60 e^{4x} c_l^2 - 160 e^{3x} c_l^2 + 240 e^{2x} c_l^2 - 192 e^x c_l^2 + 64 c_l^2 - 1}{e^{6x} c_l^2 - 12 e^{5x} c_l^2 + 60 e^{4x} c_l^2 - 160 e^{3x} c_l^2 + 240 e^{2x} c_l^2 - 192 e^x c_l^2 + 64 c_l^2 + 1} \right)
 \end{aligned}$$

$$\begin{aligned} > \text{SolGralFinalDos} := 3 \tan(y(x)) + \_C100 (-2 + e^x)^3 = 0 \\ & \text{SolGralFinalDos} := 3 \tan(y(x)) + \_C100 (-2 + e^x)^3 = 0 \end{aligned} \quad (11)$$

$$\begin{aligned} > \text{SolGralDos} := -\frac{\tan(y(x))}{(-2 + e^x)^3} = \_C100 \\ & \text{SolGralDos} := -\frac{\tan(y(x))}{(-2 + e^x)^3} = \_C100 \end{aligned} \quad (12)$$

$$\begin{aligned} > \text{DerSol} := \text{isolate}(\text{diff}(\text{SolGralDos}, x), \text{diff}(y(x), x)) \\ & \text{DerSol} := \frac{d}{dx} y(x) = \frac{3 \tan(y(x)) e^x}{(-2 + e^x) (1 + \tan(y(x))^2)} \end{aligned} \quad (13)$$

$$\begin{aligned} > \text{Ecuacion} \\ & 3 e^x \tan(y(x)) + (2 - e^x) \sec(y(x))^2 \left( \frac{d}{dx} y(x) \right) = 0 \end{aligned} \quad (14)$$

$$\begin{aligned} > \text{DerEcuacion} := \text{isolate}(\text{Ecuacion}, \text{diff}(y(x), x)) \\ & \text{DerEcuacion} := \frac{d}{dx} y(x) = -\frac{3 e^x \tan(y(x))}{(2 - e^x) \sec(y(x))^2} \end{aligned} \quad (15)$$

$$\begin{aligned} > \text{Comprobar} := \text{simplify}(\text{rhs}(\text{DerSol}) - \text{rhs}(\text{DerEcuacion})) = 0 \\ & \text{Comprobar} := 0 = 0 \end{aligned} \quad (16)$$

> restart

$$\begin{aligned} > \text{Ecua} := (y^2 + x \cdot y^2) \cdot y' + (x^2 - y \cdot x^2) = 0 \\ & \text{Ecua} := (y(x)^2 + x y(x)^2) \left( \frac{d}{dx} y(x) \right) + x^2 - y(x) x^2 = 0 \end{aligned} \quad (17)$$

> with(DEtools):

$$\begin{aligned} > \text{odeadvisor}(\text{Ecua}) \\ & \text{[_separable]} \end{aligned} \quad (18)$$

$$\begin{aligned} > M := \text{factor}(x^2 - y x^2) \\ & M := -x^2 (y - 1) \end{aligned} \quad (19)$$

$$\begin{aligned} > N := \text{factor}(y^2 + x y^2) \\ & N := y^2 (x + 1) \end{aligned} \quad (20)$$

$$\begin{aligned} > P := -x^2; Q := (y - 1); R := (x + 1); S := y^2 \\ & P := -x^2 \\ & Q := y - 1 \\ & R := x + 1 \\ & S := y^2 \end{aligned} \quad (21)$$

$$\begin{aligned} > \text{SolGral} := \text{int}\left(\frac{P}{R}, x\right) + \text{int}\left(\frac{S}{Q}, y\right) = \_C1 \\ & \text{SolGral} := -\frac{x^2}{2} + x - \ln(x + 1) + \frac{y^2}{2} + y + \ln(y - 1) = \_C1 \end{aligned} \quad (22)$$

$$\begin{aligned} > \text{SolGralFinal} := -\frac{x^2}{2} + x - \ln(x+1) + \frac{y(x)^2}{2} + y(x) + \ln(y(x)-1) =\_CI \\ & \text{SolGralFinal} := -\frac{x^2}{2} + x - \ln(x+1) + \frac{y(x)^2}{2} + y(x) + \ln(y(x)-1) =\_CI \end{aligned} \quad (23)$$

$$\begin{aligned} > \text{DerSolGralFinal} := \text{simplify}(\text{isolate}(\text{diff}(\text{SolGralFinal}, x), \text{diff}(y(x), x))) \\ & \text{DerSolGralFinal} := \frac{d}{dx} y(x) = \frac{x^2 (y(x)-1)}{(x+1) y(x)^2} \end{aligned} \quad (24)$$

$$\begin{aligned} > \text{Ecua} \\ & (y(x)^2 + x y(x)^2) \left( \frac{d}{dx} y(x) \right) + x^2 - y(x) x^2 = 0 \end{aligned} \quad (25)$$

$$\begin{aligned} > \text{DerEcua} := \text{isolate}(\text{Ecua}, \text{diff}(y(x), x)) \\ & \text{DerEcua} := \frac{d}{dx} y(x) = \frac{-x^2 + y(x) x^2}{y(x)^2 + x y(x)^2} \end{aligned} \quad (26)$$

$$\begin{aligned} > \text{Comprobar} := \text{simplify}(\text{rhs}(\text{DerSolGralFinal}) - \text{rhs}(\text{DerEcua})) = 0 \\ & \text{Comprobar} := 0 = 0 \end{aligned} \quad (27)$$

> restart

$$\begin{aligned} > \text{Ecua} := \text{sqrt}(x^2 - y^2) + y - x \cdot y' = 0 \\ & \text{Ecua} := \sqrt{x^2 - y(x)^2} + y(x) - x \left( \frac{d}{dx} y(x) \right) = 0 \end{aligned} \quad (28)$$

> with(DEtools):

$$\begin{aligned} > \text{odeadvisor}(\text{Ecua}) \\ & [[_{\text{homogeneous}}, \text{class } A], \_{\text{rational}}, \_{\text{dAlembert}}] \end{aligned} \quad (29)$$

$$\begin{aligned} > \text{EcuaDos} := \text{simplify}(\text{eval}(\text{subs}(y(x) = x \cdot u(x), \text{Ecua}))) \\ & \text{EcuaDos} := -\left( \frac{d}{dx} u(x) \right) x^2 + \sqrt{x^2 (1 - u(x)^2)} = 0 \end{aligned} \quad (30)$$

$$\begin{aligned} > \text{MM} := \text{factor}(x \cdot \sqrt{(1 - u^2)}) \\ & \text{MM} := x \sqrt{-(u-1)(u+1)} \end{aligned} \quad (31)$$

$$\begin{aligned} > \text{NN} := -x^2 \\ & \text{NN} := -x^2 \end{aligned} \quad (32)$$

$$\begin{aligned} > P := x; Q := \sqrt{-(u-1)(u+1)}; R := x^2; S := -1 \\ & P := x \\ & Q := \sqrt{-(u-1)(u+1)} \\ & R := x^2 \\ & S := -1 \end{aligned} \quad (33)$$

$$\begin{aligned} > \text{SolGralIntermedia} := \text{int}\left(\frac{P}{R}, x\right) + \text{int}\left(\frac{S}{Q}, u\right) =\_CI \\ & \text{SolGralIntermedia} := \ln(x) - \arcsin(u) =\_CI \end{aligned} \quad (34)$$

$$\begin{aligned} &> \text{SolGralPosterior} := \text{subs}\left(u = \frac{y}{x}, \text{SolGralIntermedia}\right) \\ &\quad \text{SolGralPosterior} := \ln(x) - \arcsin\left(\frac{y}{x}\right) = \_CI \end{aligned} \quad (35)$$

$$\begin{aligned} &> \text{SolGralFinal} := \ln(x) - \arcsin\left(\frac{y(x)}{x}\right) = \_CI \\ &\quad \text{SolGralFinal} := \ln(x) - \arcsin\left(\frac{y(x)}{x}\right) = \_CI \end{aligned} \quad (36)$$

$$\begin{aligned} &> \text{Ecua} \\ &\quad \sqrt{x^2 - y(x)^2} + y(x) - x \left( \frac{d}{dx} y(x) \right) = 0 \end{aligned} \quad (37)$$

$$\begin{aligned} &> \text{DerSolGral} := \text{simplify}(\text{isolate}(\text{diff}(\text{SolGralFinal}, x), \text{diff}(y(x), x))) \\ &\quad \text{DerSolGral} := \frac{d}{dx} y(x) = \frac{\sqrt{\frac{x^2 - y(x)^2}{x^2}} x + y(x)}{x} \end{aligned} \quad (38)$$

$$\begin{aligned} &> \text{DerEcua} := \text{isolate}(\text{Ecua}, \text{diff}(y(x), x)) \\ &\quad \text{DerEcua} := \frac{d}{dx} y(x) = - \frac{-\sqrt{x^2 - y(x)^2} - y(x)}{x} \end{aligned} \quad (39)$$

$$\begin{aligned} &> \text{Comprobar} := \text{simplify}(\text{rhs}(\text{DerSolGral}) - \text{rhs}(\text{DerEcua})) = 0 \\ &\quad \text{Comprobar} := \frac{\sqrt{\frac{x^2 - y(x)^2}{x^2}} x - \sqrt{x^2 - y(x)^2}}{x} = 0 \end{aligned} \quad (40)$$

$$\begin{aligned} &> \text{FuncDos} := \sqrt{\frac{x^2 - y(x)^2}{x^2}} x = \sqrt{x^2 - y(x)^2} \\ &\quad \text{FuncDos} := \sqrt{\frac{x^2 - y(x)^2}{x^2}} x = \sqrt{x^2 - y(x)^2} \end{aligned} \quad (41)$$

$$\begin{aligned} &> \text{FuncTres} := \text{lhs}(\text{FuncDos})^2 = \text{rhs}(\text{FuncDos})^2 \\ &\quad \text{FuncTres} := x^2 - y(x)^2 = x^2 - y(x)^2 \end{aligned} \quad (42)$$

$$\begin{aligned} &> \text{ComprobarDos} := \text{lhs}(\text{FuncTres}) - \text{rhs}(\text{FuncTres}) = 0 \\ &\quad \text{ComprobarDos} := 0 = 0 \end{aligned} \quad (43)$$