> $restart$

> $Ecuacion := 3\cdot\exp(x)\cdot\tan(y(x)) + (2-\exp(x))\cdot\sec(y(x))^2\cdot diff(y(x),x) = 0$

$$Ecuacion := 3\,e^x\tan(y(x)) + \left(2-e^x\right)\sec(y(x))^2\left(\frac{d}{dx}\,y(x)\right) = 0 \tag{1}$$

> $with(DEtools):$

> $odeadvisor(Ecuacion)$

$$[\_separable] \tag{2}$$

> $M := 3\,e^x\tan(y)$

$$M := 3\,e^x\tan(y) \tag{3}$$

> $N := \left(2-e^x\right)\sec(y)^2$

$$N := \left(2-e^x\right)\sec(y)^2 \tag{4}$$

> $P := 3\,e^x;\ Q := \tan(y);\ R := \left(2-e^x\right);\ S := \sec(y)^2$

$$P := 3\,e^x$$

$$Q := \tan(y)$$

$$R := 2-e^x$$

$$S := \sec(y)^2 \tag{5}$$

> $Solucion := int\left(\frac{P}{R}, x\right) + int\left(\frac{S}{Q}, y\right) = \_C1$

$$Solucion := -3\ln\left(2-e^x\right) + \ln(\tan(y)) = \_C1 \tag{6}$$

> $SolucionGeneral := simplify(\exp(lhs(Solucion))) = \_C100$

$$SolucionGeneral := -\frac{\tan(y)}{\left(-2+e^x\right)^3} = \_C100 \tag{7}$$

> $SolGralDos := lhs(SolucionGeneral)\cdot\left(-2+e^x\right)^3 = rhs(SolucionGeneral)\cdot\left(-2+e^x\right)^3$

$$SolGralDos := -\tan(y) = \_C100\left(-2+e^x\right)^3 \tag{8}$$

> $SolGralFinal := -lhs(SolGralDos) + \tan(y) + (rhs(SolGralDos) + \tan(y)) = 0$

$$SolGralFinal := 3\tan(y) + \_C100\left(-2+e^x\right)^3 = 0 \tag{9}$$

>

Para comprobar

> $Sol := dsolve(Ecuacion)$

$$Sol := y(x) \tag{10}$$

$$= \frac{1}{2}\left(\arctan\left(\left(2\,c_1\left(e^{3x}-6\,e^{2x}+12\,e^x-8\right)\right)\Big/\left(e^{6x}c_1^2-12\,e^{5x}c_1^2+60\,e^{4x}c_1^2\right.\right.\right.$$

$$\left.-160\,e^{3x}c_1^2+240\,e^{2x}c_1^2-192\,e^x c_1^2+64\,c_1^2+1\right),$$

$$\left.\left.-\frac{e^{6x}c_1^2-12\,e^{5x}c_1^2+60\,e^{4x}c_1^2-160\,e^{3x}c_1^2+240\,e^{2x}c_1^2-192\,e^x c_1^2+64\,c_1^2-1}{e^{6x}c_1^2-12\,e^{5x}c_1^2+60\,e^{4x}c_1^2-160\,e^{3x}c_1^2+240\,e^{2x}c_1^2-192\,e^x c_1^2+64\,c_1^2+1}\right)\right)$$

> $SolGralFinalDos := 3\tan(y(x)) + \_C100\,(-2+e^x)^3 = 0$

$$SolGralFinalDos := 3\tan(y(x)) + \_C100\,(-2+e^x)^3 = 0 \tag{11}$$

> $SolGralDos := -\frac{\tan(y(x))}{(-2+e^x)^3} = \_C100$

$$SolGralDos := -\frac{\tan(y(x))}{(-2+e^x)^3} = \_C100 \tag{12}$$

> $DerSol := isolate(diff(SolGralDos, x), diff(y(x), x))$

$$DerSol := \frac{d}{dx}\,y(x) = \frac{3\tan(y(x))\,e^x}{(-2+e^x)\,(1+\tan(y(x))^2)} \tag{13}$$

> $Ecuacion$

$$3\,e^x\tan(y(x)) + (2-e^x)\sec(y(x))^2\left(\frac{d}{dx}\,y(x)\right) = 0 \tag{14}$$

> $DerEcuacion := isolate(Ecuacion, diff(y(x), x))$

$$DerEcuacion := \frac{d}{dx}\,y(x) = -\frac{3\,e^x\tan(y(x))}{(2-e^x)\sec(y(x))^2} \tag{15}$$

> $Comprobar := simplify(rhs(DerSol) - rhs(DerEcuacion)) = 0$

$$Comprobar := 0 = 0 \tag{16}$$

> $restart$

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

$$Ecua := (y(x)^2 + x\,y(x)^2)\left(\frac{d}{dx}\,y(x)\right) + x^2 - y(x)\,x^2 = 0 \tag{17}$$

> $with(DEtools):$

> $odeadvisor(Ecua)$

$$[\_separable] \tag{18}$$

> $M := factor(x^2 - y\,x^2)$

$$M := -x^2\,(y-1) \tag{19}$$

> $N := factor(y^2 + x\,y^2)$

$$N := y^2\,(x+1) \tag{20}$$

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

$$P := -x^2$$

$$Q := y-1$$

$$R := x+1$$

$$S := y^2 \tag{21}$$

> $SolGral := int\left(\frac{P}{R}, x\right) + int\left(\frac{S}{Q}, y\right) = \_C1$

$$SolGral := -\frac{x^2}{2} + x - \ln(x+1) + \frac{y^2}{2} + y + \ln(y-1) = \_C1 \tag{22}$$

> $SolGralFinal := -\frac{x^2}{2} + x - \ln(x+1) + \frac{y(x)^2}{2} + y(x) + \ln(y(x)-1) = \_C1$

$$SolGralFinal := -\frac{x^2}{2} + x - \ln(x+1) + \frac{y(x)^2}{2} + y(x) + \ln(y(x)-1) = \_C1 \quad \textbf{(23)}$$

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

$$DerSolGralFinal := \frac{d}{dx} y(x) = \frac{x^2 (y(x)-1)}{(x+1)\, y(x)^2} \quad \textbf{(24)}$$

> $Ecua$

$$\left(y(x)^2 + x\, y(x)^2\right) \left(\frac{d}{dx} y(x)\right) + x^2 - y(x)\, x^2 = 0 \quad \textbf{(25)}$$

> $DerEcua := isolate(Ecua, diff(y(x), x))$

$$DerEcua := \frac{d}{dx} y(x) = \frac{-x^2 + y(x)\, x^2}{y(x)^2 + x\, y(x)^2} \quad \textbf{(26)}$$

> $Comprobar := simplify(rhs(DerSolGralFinal) - rhs(DerEcua)) = 0$

$$Comprobar := 0 = 0 \quad \textbf{(27)}$$

> $restart$

> $Ecua := \mathrm{sqrt}(x^2 - y^2) + y - x \cdot y' = 0$

$$Ecua := \sqrt{x^2 - y(x)^2} + y(x) - x \left(\frac{d}{dx} y(x)\right) = 0 \quad \textbf{(28)}$$

> $with(DEtools):$

> $odeadvisor(Ecua)$

$$[[\_homogeneous, class\ A], \_rational, \_dAlembert] \quad \textbf{(29)}$$

> $EcuaDos := simplify(eval(subs(y(x) = x \cdot u(x), Ecua)))$

$$EcuaDos := -\left(\frac{d}{dx} u(x)\right) x^2 + \sqrt{x^2 \left(1 - u(x)^2\right)} = 0 \quad \textbf{(30)}$$

> $MM := factor\left(x \cdot \sqrt{(1-u^2)}\right)$

$$MM := x \sqrt{-(u-1)\,(u+1)} \quad \textbf{(31)}$$

> $NN := -x^2$

$$NN := -x^2 \quad \textbf{(32)}$$

> $P := x; Q := \sqrt{-(u-1)\,(u+1)}; R := x^2; S := -1$

$$P := x$$

$$Q := \sqrt{-(u-1)\,(u+1)}$$

$$R := x^2$$

$$S := -1 \quad \textbf{(33)}$$

> $SolGralIntermedia := int\left(\frac{P}{R}, x\right) + int\left(\frac{S}{Q}, u\right) = \_C1$

$$SolGralIntermedia := \ln(x) - \arcsin(u) = \_C1 \quad \textbf{(34)}$$

> $SolGralPosterior := subs\left(u = \frac{y}{x}, SolGralIntermedia\right)$

$$SolGralPosterior := \ln(x) - \arcsin\left(\frac{y}{x}\right) = \_C1 \tag{35}$$

> $SolGralFinal := \ln(x) - \arcsin\left(\frac{y(x)}{x}\right) = \_C1$

$$SolGralFinal := \ln(x) - \arcsin\left(\frac{y(x)}{x}\right) = \_C1 \tag{36}$$

> $Ecua$

$$\sqrt{x^2 - y(x)^2} + y(x) - x\left(\frac{d}{dx}\, y(x)\right) = 0 \tag{37}$$

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

$$DerSolGral := \frac{d}{dx}\, y(x) = \frac{\sqrt{\frac{x^2 - y(x)^2}{x^2}}\; x + y(x)}{x} \tag{38}$$

> $DerEcua := isolate(Ecua, diff(y(x), x))$

$$DerEcua := \frac{d}{dx}\, y(x) = -\frac{-\sqrt{x^2 - y(x)^2} - y(x)}{x} \tag{39}$$

> $Comprobar := simplify(rhs(DerSolGral) - rhs(DerEcua)) = 0$

$$Comprobar := \frac{\sqrt{\frac{x^2 - y(x)^2}{x^2}}\; x - \sqrt{x^2 - y(x)^2}}{x} = 0 \tag{40}$$

> $FuncDos := \sqrt{\frac{x^2 - y(x)^2}{x^2}}\; x = \sqrt{x^2 - y(x)^2}$

$$FuncDos := \sqrt{\frac{x^2 - y(x)^2}{x^2}}\; x = \sqrt{x^2 - y(x)^2} \tag{41}$$

> $FuncTres := lhs(FuncDos)^2 = rhs(FuncDos)^2$

$$FuncTres := x^2 - y(x)^2 = x^2 - y(x)^2 \tag{42}$$

> $ComprobarDos := lhs(FuncTres) - rhs(FuncTres) = 0$

$$ComprobarDos := 0 = 0 \tag{43}$$

>