> *restart*

> $Ecua := \left(x^4 \cdot \log(x) - 2 \cdot x \cdot y^3\right) + 3 \cdot x^2 \cdot y^2 \cdot y' = 0$

$$Ecua := x^4 \ln(x) - 2\, x\, y(x)^3 + 3\, x^2\, y(x)^2 \left(\frac{d}{dx}\, y(x)\right) = 0 \tag{1}$$

> *with(DEtools)* :
> *with(linalg)* :
> *with(plots)* :
> *with(inttrans)* :
> *with(PDEtools)* :
> *odeadvisor(Ecua)*

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

> $FI := intfactor(Ecua)$

$$FI := \frac{1}{x^4} \tag{3}$$

> $M := x^4 \ln(x) - 2\, x\, y^3$

$$M := x^4 \ln(x) - 2\, x\, y^3 \tag{4}$$

> $N := 3\, x^2\, y^2$

$$N := 3\, x^2\, y^2 \tag{5}$$

> $MM := expand(FI \cdot M)$

$$MM := \ln(x) - \frac{2\, y^3}{x^3} \tag{6}$$

> $NN := FI \cdot N$

$$NN := \frac{3\, y^2}{x^2} \tag{7}$$

> $EcuaDos := \ln(x) - \dfrac{2\, y(x)^3}{x^3} + \dfrac{3\, y(x)^2}{x^2} \cdot diff(y(x), x) = 0$

$$EcuaDos := \ln(x) - \frac{2\, y(x)^3}{x^3} + \frac{3\, y(x)^2 \left(\frac{d}{dx}\, y(x)\right)}{x^2} = 0 \tag{8}$$

> *odeadvisor(EcuaDos)*

$$[\_exact, \_Bernoulli] \tag{9}$$

> $IMMx := int(MM, x)$

$$IMMx := x \ln(x) - x + \frac{y^3}{x^2} \tag{10}$$

> $SolGral := IMMx + int((NN - diff(IMMx, y)), y) = \_C1$

$$SolGral := x \ln(x) - x + \frac{y^3}{x^2} = \_C1 \tag{11}$$

> $INNy := int(NN, y)$

$$INNy := \frac{y^3}{x^2} \tag{12}$$

> $SolGralTres := INNy + int((MM - diff(INNy, x)), x) = \ C1$

$$SolGralTres := x \ln(x) - x + \frac{y^3}{x^2} = \_C1 \tag{13}$$

> $SolGralDos := x \ln(x) - x + \dfrac{y(x)^3}{x^2} = \_C1$

$$SolGralDos := x \ln(x) - x + \frac{y(x)^3}{x^2} = \_C1 \tag{14}$$

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

$$DerEcua := \frac{d}{dx} y(x) = -\frac{1}{3} \frac{x^2 \ln(x)}{y(x)^2} + \frac{2}{3} \frac{y(x)}{x} \tag{15}$$

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

$$DerSolGralDos := \frac{d}{dx} y(x) = -\frac{1}{3} \frac{x^2 \ln(x)}{y(x)^2} + \frac{2}{3} \frac{y(x)}{x} \tag{16}$$

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

$$Comprobar := 0 = 0 \tag{17}$$

> $restart$

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

$$Ecua := \frac{d}{dx} y(x) + 2 x y(x) = 2 x e^{-x^2} \tag{18}$$

> $p := 2 \cdot x$

$$p := 2 x \tag{19}$$

> $q := 2 \cdot x \cdot \exp(-x^2)$

$$q := 2 x e^{-x^2} \tag{20}$$

> $SolGral := y(x) = \_C1 \cdot \exp(int(-p, x)) + \exp(int(-p, x)) \cdot int(\exp(int(p, x)) \cdot q, x)$

$$SolGral := y(x) = \_C1 \, e^{-x^2} + e^{-x^2} x^2 \tag{21}$$

> $SolGralDos := dsolve(Ecua)$

$$SolGralDos := y(x) = \left(x^2 + \_C1\right) e^{-x^2} \tag{22}$$

> $Comprobar := simplify(eval(subs(y(x) = rhs(SolGral), lhs(Ecua) - rhs(Ecua) = 0)))$

$$Comprobar := 0 = 0 \tag{23}$$

>
>
>