> *restart*

>

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

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

> $with(DEtools):$

> $odeadvisor(Ecua)$

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

> $P := -1; Q := e^y$

$$P := -1$$

$$Q := e^y \tag{3}$$

> $R := (1 + e^x); S := y$

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

$$S := y \tag{4}$$

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

$$SolGral := \ln\left(1 + e^x\right) - \ln\left(e^x\right) - \frac{y + 1}{e^y} = \_C1 \tag{5}$$

> $SolGralDos := \ln\left(1 + e^x\right) - \ln\left(e^x\right) - \frac{y(x) + 1}{e^{y(x)}} = \_C1$

$$SolGralDos := \ln\left(1 + e^x\right) - \ln\left(e^x\right) - \frac{y(x) + 1}{e^{y(x)}} = \_C1 \tag{6}$$

> $DerSolGralDos := diff(SolGralDos, x)$

$$DerSolGralDos := \frac{e^x}{1 + e^x} - 1 - \frac{\frac{d}{dx} y(x)}{e^{y(x)}} + \frac{(y(x) + 1)\left(\frac{d}{dx} y(x)\right)}{e^{y(x)}} = 0 \tag{7}$$

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

$$DerSolGralTres := \frac{d}{dx} y(x) = \frac{-\dfrac{e^x}{1 + e^x} + 1}{-\dfrac{1}{e^{y(x)}} + \dfrac{y(x) + 1}{e^{y(x)}}} \tag{8}$$

> $DerSolGralCuatro := simplify(DerSolGralTres)$

$$DerSolGralCuatro := \frac{d}{dx} y(x) = \frac{e^{y(x)}}{\left(1 + e^x\right) y(x)} \tag{9}$$

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

$$DerEcua := \frac{d}{dx} y(x) = \frac{e^{y(x)}}{\left(1 + e^x\right) y(x)} \tag{10}$$

> $Comprobacion := rhs(DerEcua) - rhs(DerSolGralCuatro) = 0$

$$Comprobacion := 0 = 0 \tag{11}$$

> $Sol := dsolve(Ecua)$

$$Sol := y(x) = -\mathrm{LambertW}\left(-\left(\ln\left(1 + e^x\right) - x - \_C1\right) e^{-1}\right) - 1 \tag{12}$$

> *SolGralDos*

$$\ln(1 + e^x) - \ln(e^x) - \frac{y(x) + 1}{e^{y(x)}} = \_C1 \tag{13}$$

> *restart*

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

$$Ecua := 2x \left(\frac{d}{dx} y(x) \right) (x^2 + y(x)^2) = y(x) (y(x)^2 + 2x^2) \tag{14}$$

> *with(DEtools)* :

> *odeadvisor(Ecua)*

$$[[\_homogeneous,\ class\ A],\ \_rational,\ \_dAlembert] \tag{15}$$

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

$$EcuaDos := 2x \left(\frac{d}{dx} (u(x)\ x) \right) (x^2 + u(x)^2 x^2) = u(x)\ x \left(u(x)^2 x^2 + 2x^2 \right) \tag{16}$$

> *odeadvisor(EcuaDos)*

$$[\_separable] \tag{17}$$

> $DerEcuaTres := simplify(isolate(EcuaDos, diff(u(x), x)))$

$$DerEcuaTres := \frac{d}{dx} u(x) = -\frac{1}{2} \frac{u(x)^3}{x \left(u(x)^2 + 1 \right)} \tag{18}$$

> $SolGral := int\left(\frac{1}{x}, x \right) + int\left(\frac{1}{\frac{1}{2} \frac{u^3}{(u^2 + 1)}}, u \right) = \_C1$

$$SolGral := \ln(x) - \frac{1}{u^2} + 2\ln(u) = \_C1 \tag{19}$$

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

$$SolGralDos := \ln(x) - \frac{x^2}{y^2} + 2\ln\left(\frac{y}{x} \right) = \_C1 \tag{20}$$

> $SolGralTres := \ln(x) - \frac{x^2}{y(x)^2} + 2\ln\left(\frac{y(x)}{x} \right) = \_C1$

$$SolGralTres := \ln(x) - \frac{x^2}{y(x)^2} + 2\ln\left(\frac{y(x)}{x} \right) = \_C1 \tag{21}$$

> $DerSolGralTres := simplify(isolate(diff(SolGralTres, x), diff(y(x), x)))$

$$DerSolGralTres := \frac{d}{dx} y(x) = \frac{1}{2} \frac{y(x) \left(y(x)^2 + 2x^2 \right)}{x \left(x^2 + y(x)^2 \right)} \tag{22}$$

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

$$DerEcua := \frac{d}{dx} y(x) = \frac{1}{2} \frac{y(x) \left(y(x)^2 + 2x^2 \right)}{x \left(x^2 + y(x)^2 \right)} \tag{23}$$

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

$$Comprobar := 0 = 0 \tag{24}$$

> *restart*

> $Ecua := x^3 + x \cdot y^2 + (x^2 y + y^3) \cdot y' = 0$

$$Ecua := x^3 + x\,y(x)^2 + \left(x^2\,y(x) + y(x)^3\right)\left(\frac{d}{dx}\,y(x)\right) = 0 \tag{25}$$

> $with(DEtools):$
> $odeadvisor(Ecua)$

$$[\_separable] \tag{26}$$

> $M := x^3 + x\,y^2$

$$M := x^3 + x\,y^2 \tag{27}$$

> $N := \left(x^2\,y + y^3\right)$

$$N := x^2\,y + y^3 \tag{28}$$

> $Comprobar := diff(M, y) - diff(N, x) = 0$

$$Comprobar := 0 = 0 \tag{29}$$

> $IntMx := int(M, x)$

$$IntMx := \frac{1}{4}\,x^4 + \frac{1}{2}\,x^2\,y^2 \tag{30}$$

> $SolGral := IntMx + int((N - diff(IntMx, y)), y) = \_C1$

$$SolGral := \frac{1}{4}\,x^4 + \frac{1}{2}\,x^2\,y^2 + \frac{1}{4}\,y^4 = \_C1 \tag{31}$$

> $SolGralDos := \frac{1}{4}\,x^4 + \frac{1}{2}\,x^2\,y(x)^2 + \frac{1}{4}\,y(x)^4 = \_C1$

$$SolGralDos := \frac{1}{4}\,x^4 + \frac{1}{2}\,x^2\,y(x)^2 + \frac{1}{4}\,y(x)^4 = \_C1 \tag{32}$$

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

$$DerSolGralDos := \frac{d}{dx}\,y(x) = \frac{-x^3 - x\,y(x)^2}{x^2\,y(x) + y(x)^3} \tag{33}$$

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

$$DerEcua := \frac{d}{dx}\,y(x) = \frac{-x^3 - x\,y(x)^2}{x^2\,y(x) + y(x)^3} \tag{34}$$

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

$$Comprobacion := 0 = 0 \tag{35}$$

>