> *restart*

> $Ecuacion := \sqrt{x^2 - y(x)^2} + y(x) - x \cdot diff(y(x), x) = 0$

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

> *with(DEtools) :*

> *odeadvisor(Ecuacion)*

$$[[\_homogeneous, class\ A], \_rational, \_dAlembert] \quad (2)$$

> $EcuacionDos := simplify(eval(subs(y(x) = u(x) \cdot x, Ecuacion)))$

$$EcuacionDos := -\left(\frac{d}{dx} u(x) \right) x^2 + \sqrt{-x^2 \left(u(x)^2 - 1 \right)} = 0 \quad (3)$$

> *odeadvisor(EcuacionDos)*

$$[[\_homogeneous, class\ G], \_rational] \quad (4)$$

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

$$P := x$$

$$Q := \sqrt{-u^2 + 1}$$

$$R := x^2$$

$$S := -1 \quad (5)$$

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

$$SolGralIntermedia := u = -\sin(\_C1 - \ln(x)) \quad (6)$$

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

$$SolucionGeneral := y(x) = -\sin(\_C1 - \ln(x))\, x \quad (7)$$

> $Comprobar := simplify(eval(subs(y(x) = rhs(SolucionGeneral), Ecuacion)))$

$$Comprobar := -x \cos(\_C1 - \ln(x)) + \sqrt{x^2 \cos(\_C1 - \ln(x))^2} = 0 \quad (8)$$

> $ComprobarDos := lhs(Comprobar) - (-x \cos(\_C1 - \ln(x))) = rhs(Comprobar) - (-x \cos(\_C1 - \ln(x)))$

$$ComprobarDos := \sqrt{x^2 \cos(\_C1 - \ln(x))^2} = x \cos(\_C1 - \ln(x)) \quad (9)$$

> $ComprobarTres := simplify\left(\frac{lhs(ComprobarDos)^2}{x^2} = \frac{rhs(ComprobarDos)^2}{x^2} \right)$

$$ComprobarTres := \cos(\_C1 - \ln(x))^2 = \cos(\_C1 - \ln(x))^2 \quad (10)$$

> $ComprobarCuatro := lhs(ComprobarTres) - rhs(ComprobarTres) = 0$

$$ComprobarCuatro := 0 = 0 \quad (11)$$

> *restart*

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

$$Ecuacion := y(x) \left(y(x)^2 + 2x^2 \right) - 2x \left(x^2 + y(x)^2 \right) \left(\frac{d}{dx} y(x) \right) = 0 \quad (12)$$

> *with(DEtools) :*

> *odeadvisor(Ecuacion)*

$$[[\_homogeneous, class\ A], \_rational, \_dAlembert] \quad (13)$$

> $EcuacionDos := isolate(simplify(eval(subs(y(x) = x \cdot u(x), Ecuacion))), diff(u(x), x))$

$$EcuacionDos := \frac{d}{dx} u(x) = -\frac{u(x)^3}{2\,u(x)^2 x + 2x} \quad (14)$$

> $EcuacionTres := lhs(EcuacionDos)\cdot(2\,u(x)^2 x + 2x) = rhs(EcuacionDos)\cdot(2\,u(x)^2 x + 2x)$

$$EcuacionTres := \left(\frac{d}{dx} u(x)\right)(2\,u(x)^2 x + 2x) = -u(x)^3 \quad (15)$$

> $EcuacionCero := lhs(EcuacionTres) - (-u(x)^3) = rhs(EcuacionTres) - (-u(x)^3)$

$$EcuacionCero := \left(\frac{d}{dx} u(x)\right)(2\,u(x)^2 x + 2x) + u(x)^3 = 0 \quad (16)$$

>

>

> $odeadvisor(EcuacionDos)$

$$[\_separable] \quad (17)$$

> $P := 1; Q := u^3; R := 2\cdot x; S := u^2 + 1$

$$P := 1$$
$$Q := u^3$$
$$R := 2x$$
$$S := u^2 + 1 \quad (18)$$

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

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

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

$$SolGralFinal := \frac{1}{2}\ln(x) - \frac{1}{2}\frac{x^2}{y(x)^2} + \ln\left(\frac{y(x)}{x}\right) = \_C1 \quad (20)$$

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

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

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

$$DerSolGral := \frac{d}{dx} y(x) = \frac{1}{2}\frac{y(x)\,(y(x)^2 + 2x^2)}{x\,(x^2 + y(x)^2)} \quad (22)$$

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

$$Comprobar := 0 = 0 \quad (23)$$

>