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> restart
> Ecua := (exp(x)·log(y)) + (2(-1)·exp(2·x)·y(-1))·y'=0

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$$Ecua := e^x \ln(y(x)) + \frac{e^{2x} \left(\frac{d}{dx} y(x) \right)}{2 y(x)} = 0 \quad (1)$$

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> Cond := y(0) = exp(1)

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$$Cond := y(0) = e \quad (2)$$

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> with(DEtools):
> odeadvisor(Ecua)

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$$[_separable] \quad (3)$$

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> M := ex ln(y)

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$$M := e^x \ln(y) \quad (4)$$

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> N := \frac{e^{2x}}{2y}

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$$N := \frac{e^{2x}}{2y} \quad (5)$$

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> P := exp(x); Q := log(y); R := exp(2·x); S := \frac{1}{2·y}

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$$\begin{aligned} P &:= e^x \\ Q &:= \ln(y) \\ R &:= e^{2x} \\ S &:= \frac{1}{2y} \end{aligned} \quad (6)$$

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

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$$SolGral := -e^{-x} + \frac{\ln(\ln(y))}{2} = _C1 \quad (7)$$

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> SolGralDos := -e-x + \frac{\ln(\ln(y(x)))}{2} = _C1

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$$SolGralDos := -e^{-x} + \frac{\ln(\ln(y(x)))}{2} = _C1 \quad (8)$$

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

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$$DerSolGralDos := \frac{d}{dx} y(x) = -2 e^{-x} y(x) \ln(y(x)) \quad (9)$$

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> Ecua

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$$e^x \ln(y(x)) + \frac{e^{2x} \left(\frac{d}{dx} y(x) \right)}{2 y(x)} = 0 \quad (10)$$

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

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$$(11)$$

$$DerEcua := \frac{d}{dx} y(x) = -2 e^{-x} y(x) \ln(y(x)) \quad (11)$$

$$\begin{aligned} &> ComprobaUno := rhs(DerSolGralDos) - rhs(DerEcua) = 0 \\ &ComprobaUno := 0 = 0 \end{aligned} \quad (12)$$

$$\begin{aligned} &> Para := simplify(subs(x=0, y(0) = \exp(1), SolGralDos)) \\ &Para := -1 = _C1 \end{aligned} \quad (13)$$

$$\begin{aligned} &> SolPart := subs(_C1 = lhs(Para), SolGralDos) \\ &SolPart := -e^{-x} + \frac{\ln(\ln(y(x)))}{2} = -1 \end{aligned} \quad (14)$$

$$\begin{aligned} &> ComprobarDos := simplify(subs(x=0, y(0) = \exp(1), SolPart)) \\ &ComprobarDos := -1 = -1 \end{aligned} \quad (15)$$

$$\begin{aligned} &> ComprobarTres := isolate(diff(SolPart, x), diff(y(x), x)) \\ &ComprobarTres := \frac{d}{dx} y(x) = -2 e^{-x} y(x) \ln(y(x)) \end{aligned} \quad (16)$$

$$\begin{aligned} &> DerEcua \\ &\frac{d}{dx} y(x) = -2 e^{-x} y(x) \ln(y(x)) \end{aligned} \quad (17)$$

$$\begin{aligned} &> restart \\ &> Ecua := x^2 \cdot y' = 1 - x^2 + y^2 - x^2 \cdot y^2 \\ &Ecua := x^2 \left(\frac{d}{dx} y(x) \right) = 1 - x^2 + y(x)^2 - x^2 y(x)^2 \end{aligned} \quad (18)$$

$$\begin{aligned} &> with(DEtools): \\ &> odeadvisor(Ecua) \\ &[_separable] \end{aligned} \quad (19)$$

$$\begin{aligned} &> intfactor(Ecua) \\ &\frac{1}{(y(x)^2 + 1) x^2} \end{aligned} \quad (20)$$

$$\begin{aligned} &> IntFact := \frac{1}{(y^2 + 1) x^2} \\ &IntFact := \frac{1}{(y^2 + 1) x^2} \end{aligned} \quad (21)$$

$$\begin{aligned} &> M := factor(-(1 - x^2 + y^2 - x^2 y^2)) \\ &M := (y^2 + 1) (x - 1) (x + 1) \end{aligned} \quad (22)$$

$$\begin{aligned} &> N := x^2 \\ &N := x^2 \end{aligned} \quad (23)$$

$$\begin{aligned} &> P := expand((x - 1) \cdot (x + 1)) \\ &P := x^2 - 1 \end{aligned} \quad (24)$$

$$\begin{aligned} &> Q := (y^2 + 1) \\ &Q := y^2 + 1 \end{aligned} \quad (25)$$

$$\begin{array}{l} \text{> } R := x^2 \\ R := x^2 \end{array} \quad (26)$$

$$\begin{array}{l} \text{> } S := 1 \\ S := 1 \end{array} \quad (27)$$

$$\begin{array}{l} \text{> } SolGral := \int \left(\frac{P}{R}, x \right) + \int \left(\frac{S}{Q}, y \right) = _CI \\ SolGral := x + \frac{1}{x} + \arctan(y) = _CI \end{array} \quad (28)$$

$$\begin{array}{l} \text{> } SolGralFinal := x + \frac{1}{x} + \arctan(y(x)) = _CI \\ SolGralFinal := x + \frac{1}{x} + \arctan(y(x)) = _CI \end{array} \quad (29)$$

$$\begin{array}{l} \text{> } DerSolGralFinal := \text{expand}(\text{isolate}(\text{diff}(SolGralFinal, x), \text{diff}(y(x), x))) \\ DerSolGralFinal := \frac{d}{dx} y(x) = -y(x)^2 - 1 + \frac{y(x)^2}{x^2} + \frac{1}{x^2} \end{array} \quad (30)$$

$$\begin{array}{l} \text{> } Ecua \\ x^2 \left(\frac{d}{dx} y(x) \right) = 1 - x^2 + y(x)^2 - x^2 y(x)^2 \end{array} \quad (31)$$

$$\begin{array}{l} \text{> } DerEcua := \text{expand}(\text{isolate}(Ecua, \text{diff}(y(x), x))) \\ DerEcua := \frac{d}{dx} y(x) = -y(x)^2 - 1 + \frac{y(x)^2}{x^2} + \frac{1}{x^2} \end{array} \quad (32)$$

$$\begin{array}{l} \text{> } MM := \text{simplify}(M \cdot \text{IntFact}) \\ MM := \frac{x^2 - 1}{x^2} \end{array} \quad (33)$$

$$\begin{array}{l} \text{> } NN := N \cdot \text{IntFact} \\ NN := \frac{1}{y^2 + 1} \end{array} \quad (34)$$

$$\begin{array}{l} \text{> } IntMMx := \int(MM, x) \\ IntMMx := x + \frac{1}{x} \end{array} \quad (35)$$

$$\begin{array}{l} \text{> } SolGralDos := IntMMx + \int((NN - \text{diff}(IntMMx, y)), y) = _CI \\ SolGralDos := x + \frac{1}{x} + \arctan(y) = _CI \end{array} \quad (36)$$

$$\begin{array}{l} \text{> } SolGral \\ x + \frac{1}{x} + \arctan(y) = _CI \end{array} \quad (37)$$

$$\begin{array}{l} \text{> } IntNNy := \int(NN, y) \\ IntNNy := \arctan(y) \end{array} \quad (38)$$

$$\begin{array}{l} \text{> } SolGralTres := IntNNy + \int((MM - \text{diff}(IntNNy, x)), x) = _CI \\ \end{array} \quad (39)$$

$$\text{SolGralTres} := x + \frac{1}{x} + \arctan(y) = _CI \quad (39)$$

> restart

$$\text{Ecua} := y' = \frac{2 \cdot x \cdot y}{(3 \cdot x^2 - y^2)}$$

$$\text{Ecua} := \frac{d}{dx} y(x) = \frac{2 x y(x)}{3 x^2 - y(x)^2} \quad (40)$$

> with(DEtools):

> odeadvisor(Ecua)

$$[_{\text{homogeneous}}, \text{class } A], _rational, _dAlembert] \quad (41)$$

> EcuaDos := simplify(isolate(eval(subs(y(x) = x·u(x), Ecua)), diff(u(x), x)))

$$\text{EcuaDos} := \frac{d}{dx} u(x) = \frac{u(x) \left(-1 + \frac{2}{3 - u(x)^2} \right)}{x} \quad (42)$$

> odeadvisor(EcuaDos)

$$[_{\text{separable}}] \quad (43)$$

$$M := \text{expand} \left(- \left(u \cdot \left(-1 + \frac{2}{3 - u^2} \right) \right) \right)$$

$$M := u - \frac{2 u}{-u^2 + 3} \quad (44)$$

> N := x

$$N := x \quad (45)$$

> P := 1

$$P := 1 \quad (46)$$

> Q := M

$$Q := u - \frac{2 u}{-u^2 + 3} \quad (47)$$

> R := N

$$R := x \quad (48)$$

> S := 1

$$S := 1 \quad (49)$$

$$\text{SolGral} := \int \left(\frac{P}{R}, x \right) + \int \left(\frac{S}{Q}, u \right) = _CI$$

$$\text{SolGral} := \ln(x) - \ln(u - 1) - \ln(u + 1) + 3 \ln(u) = _CI \quad (50)$$

> SolGralDos := simplify(exp(lhs(SolGral))) = _CI

$$\text{SolGralDos} := \frac{x u^3}{u^2 - 1} = _CI \quad (51)$$

$$\text{SolFinal} := \text{simplify} \left(\text{subs} \left(u = \frac{y(x)}{x}, \text{SolGralDos} \right) \right)$$

$$SolFinal := \frac{y(x)^3}{y(x)^2 - x^2} = -CI \quad (52)$$

> *Ecua*

$$\frac{d}{dx} y(x) = \frac{2 x y(x)}{3 x^2 - y(x)^2} \quad (53)$$

> *DerSolFinal := isolate(diff(SolFinal, x), diff(y(x), x))*

$$DerSolFinal := \frac{d}{dx} y(x) = -\frac{2 y(x) x}{y(x)^2 - 3 x^2} \quad (54)$$

> *restart*

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