

```
> restart
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>
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$$(y^2 + x y^2) \frac{dy}{dx} + (x^2 - y x^2) = 0$$

```
> Ecuacion := (y(x)·2 + x·y(x)·2)·diff(y(x), x) + x·2 - y(x)·x·2 = 0;
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$$Ecuacion := (y(x)^2 + x y(x)^2) \left(\frac{d}{dx} y(x) \right) + x^2 - y(x) x^2 = 0 \quad (1)$$

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> with(DEtools) :
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```
> odeadvisor(Ecuacion);
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[_separable] (2)

```
> M(x, y) := x·2 - y·x·2;
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$$M(x, y) := x^2 - y x^2 \quad (3)$$

```
> N(x, y) := y·2 + x·y·2;
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$$N(x, y) := y^2 + x y^2 \quad (4)$$

```
> factor(M(x, y));
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$$-x^2 (-1 + y) \quad (5)$$

```
> factor(N(x, y));
```

$$y^2 (1 + x) \quad (6)$$

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

$$Q(y) := -1 + y$$

$$R(x) := 1 + x$$

$$S(y) := y^2 \quad (7)$$

```
> SolucionGeneral := int( P(x)/R(x), x ) + int( S(y)/Q(y), y ) = C1;
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$$SolucionGeneral := -\frac{1}{2} x^2 + x - \ln(1 + x) + y + \frac{1}{2} y^2 + \ln(-1 + y) = C1 \quad (8)$$

```
> SolucionDerivable := -1/2 x^2 + x - ln(1 + x) + y(x) + 1/2 y(x)^2 + ln(-1 + y(x)) = C1
```

$$SolucionDerivable := -\frac{1}{2} x^2 + x - \ln(1 + x) + y(x) + \frac{1}{2} y(x)^2 + \ln(-1 + y(x)) = C1 \quad (9)$$

```
> Der := simplify(isolate(diff(SolucionDerivable, x), diff(y(x), x)));
```

$$Der := \frac{d}{dx} y(x) = \frac{x^2 (-1 + y(x))}{(1 + x) y(x)^2} \quad (10)$$

```
> Des := isolate(Ecuacion, diff(y(x), x));
```

$$Des := \frac{d}{dx} y(x) = \frac{-x^2 + y(x) x^2}{y(x)^2 + x y(x)^2} \quad (11)$$

```
> comprobacion := simplify(rhs(Des) - rhs(Der)) = 0;
```

(12)

$$\text{comprobacion} := 0 = 0 \quad (12)$$

> restart :

>

$$(xy^2 - y^2 + x - 1) dx + (x^2y - 2xy + x^2 + 2y - 2x + 2) dy = 0.$$

$$u' = \tan(v - u).$$

> Ecuacion := (x·y(x)·2 - y(x)·2 + x - 1) + (x·2·y(x) - 2·x·y(x) + x·2 + 2·y(x) - 2·x + 2)diff(y(x), x) = 0;

$$\text{Ecuacion} := xy(x)^2 - y(x)^2 + x - 1 + (x^2y(x) - 2xy(x) + x^2 + 2y(x) - 2x + 2) \left(\frac{d}{dx} y(x) \right) = 0 \quad (13)$$

> with(DEtools) :

> odeadvisor(Ecuacion);

$$[_{\text{separable}}] \quad (14)$$

> M(x, y) := subs(y(x) = y, x·y(x)·2 - y(x)·2 + x - 1)

$$M(x, y) := xy^2 - y^2 + x - 1 \quad (15)$$

> N(x, y) := subs(y(x) = y, x·2·y(x) - 2·x·y(x) + x·2 + 2·y(x) - 2·x + 2)

$$N(x, y) := x^2y - 2xy + x^2 + 2y - 2x + 2 \quad (16)$$

> factor(M(x, y));

$$(y^2 + 1)(x - 1) \quad (17)$$

> factor(N(x, y));

$$(x^2 - 2x + 2)(1 + y) \quad (18)$$

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

$$P(x) := x - 1$$

$$Q(y) := y^2 + 1$$

$$R(x) := x^2 - 2x + 2$$

$$S(y) := 1 + y \quad (19)$$

> SolucionGeneral := int(P(x)/R(x), x) + int(S(y)/Q(y), y) = C1;

$$\text{SolucionGeneral} := \frac{1}{2} \ln(x^2 - 2x + 2) + \frac{1}{2} \ln(y^2 + 1) + \arctan(y) = C1 \quad (20)$$

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