

> restart

>

$$2xy^3 + 32x^3y^2 + 18x^2y^5 + (3x^2y^2 + 16x^4y + 30x^3y^4) \frac{dy}{dx} = 0$$

> Ecuacion := 2·x·y(x)·3 + 32·x·3·y(x)·2 + 18·x·2·y(x)·5 + (3·x·2·y(x)·2 + 16·x·4·y(x) + 30·x·3·y(x)·4)·diff(y(x), x) = 0

$$\text{Ecuacion} := 2xy(x)^3 + 32x^3y(x)^2 + 18x^2y(x)^5 + (3x^2y(x)^2 + 16x^4y(x) + 30x^3y(x)^4) \left(\frac{d}{dx} y(x) \right) = 0 \quad (1)$$

> with(DEtools) :

> odeadvisor(Ecuacion)

[_exact, _rational, _dAlembert] (2)

> M := 2·x·y·3 + 32·x·3·y·2 + 18·x·2·y·5

$$M := 2xy^3 + 32x^3y^2 + 18x^2y^5 \quad (3)$$

> N := 3·x·2·y·2 + 16·x·4·y + 30·x·3·y·4

$$N := 3x^2y^2 + 16x^4y + 30x^3y^4 \quad (4)$$

> comprobacion := simplify(diff(M, y) - diff(N, x)) = 0

$$\text{comprobacion} := 0 = 0 \quad (5)$$

> SolucionGeneral := int(M, x) + int((N - diff(int(M, x), y)), y) = C₁

$$\text{SolucionGeneral} := x^2y^3 + 8y^2x^4 + 6y^5x^3 = C_1 \quad (6)$$

> SolGral := int(N, y) + int((M - diff(int(N, y), x)), x) = C₁

$$\text{SolGral} := x^2y^3 + 8y^2x^4 + 6y^5x^3 = C_1 \quad (7)$$

> restart

>

$$231. \left(\frac{1}{y} \sin \frac{x}{y} - \frac{y}{x^2} \cos \frac{y}{x} + 1 \right) dx + \left(\frac{1}{x} \cos \frac{y}{x} - \frac{x}{y^2} \sin \frac{x}{y} + \frac{1}{y^2} \right) dy =$$

> Ecuacion := $\left(\frac{1}{y(x)} \cdot \sin\left(\frac{x}{y(x)}\right) - \frac{y(x)}{x \cdot 2} \cdot \cos\left(\frac{y(x)}{x}\right) + 1 \right) + \left(\frac{1}{x} \cdot \cos\left(\frac{y(x)}{x}\right) - \frac{x}{y(x) \cdot 2} \cdot \sin\left(\frac{x}{y(x)}\right) + \frac{1}{y(x) \cdot 2} \right) \cdot \text{diff}(y(x), x) = 0$

$$\text{Ecuacion} := \frac{\sin\left(\frac{x}{y(x)}\right)}{y(x)} - \frac{y(x) \cos\left(\frac{y(x)}{x}\right)}{x^2} + 1 + \left(\frac{\cos\left(\frac{y(x)}{x}\right)}{x} - \frac{x \sin\left(\frac{x}{y(x)}\right)}{y(x)^2} + \frac{1}{y(x)^2} \right) \left(\frac{d}{dx} y(x) \right) = 0 \quad (8)$$

> with(DEtools);
 [AreSimilar, DEnormal, DEplot, DEplot3d, DEplot_polygon, DFactor, DFactorLCLM, DFactorsols, Dchangevar, FunctionDecomposition, GCRD, Gosper, Heunsols, Homomorphisms, IVPsol, IsHyperexponential, LCLM, MeijerGsols, MultiplicativeDecomposition, ODEInvariants, PDEchangecoords, PolynomialNormalForm, RationalCanonicalForm, ReduceHyperexp, RiemannPsols, Xchange, Xcommutator, Xgauge, Zeilberger, abelsol, adjoint, autonomous, bernoullisol, buildsol, buildsym, canoni, caseplot, casesplit, checkrank, chinisol, clairautsol, constcoeffsols, convertAlg, convertsys, dalembertsol, dcoeffs, de2diffop, dfieldplot, diff_table, diffop2de, dperiodic_sols, dpolyform, dsubs, eigenring, endomorphism_charpoly, equinv, eta_k, eulersols, exactsol, expsols, exterior_power, firint, firtest, formal_sol, gen_exp, generate_ic, genhomosol, gensys, hamilton_eqs, hypergeomsols, hyperode, indicialeq, infgen, initialdata, integrate_sols, intfactor, invariants, kovaciccsols, leftdivision, liesol, line_int, linearsol, matrixDE, matrix_riccati, maxdimsystems, moser_reduce, muchange, mult, mutest, newton_polygon, normalG2, ode_int_y, ode_y1, odeadvisor, odepde, parametricsol, particularsol, phaseportrait, poincare, polysols, power_equivalent, rational_equivalent, ratsols, redode, reduceOrder, reduce_order, regular_parts, regularsp, remove_RootOf, riccati_system, riccatisol, rifread, rifsimp, rightdivision, rtaylor, separablesol, singularities, solve_group, super_reduce, symgen, symmetric_power, symmetric_product, symtest, transinv, translate, untranslate, varparam, zoom]

> odeadvisor(Ecuacion) [_exact] (9)

$$M := \frac{1}{y} \cdot \sin\left(\frac{x}{y}\right) - \frac{y}{x \cdot 2} \cdot \cos\left(\frac{y}{x}\right) + 1$$

$$M := \frac{\sin\left(\frac{x}{y}\right)}{y} - \frac{y \cos\left(\frac{y}{x}\right)}{x^2} + 1 \quad (11)$$

$$N := \frac{1}{x} \cdot \cos\left(\frac{y}{x}\right) - \frac{x}{y \cdot 2} \cdot \sin\left(\frac{x}{y}\right) + \frac{1}{y \cdot 2}$$

$$N := \frac{\cos\left(\frac{y}{x}\right)}{x} - \frac{x \sin\left(\frac{x}{y}\right)}{y^2} + \frac{1}{y^2} \quad (12)$$

$$\text{comprobacion} := \text{simplify}(\text{diff}(M, y) - \text{diff}(N, x)) = 0$$

$$\text{comprobacion} := 0 = 0 \quad (13)$$

$$\text{IntMx} := \text{int}(M, x)$$

$$\text{IntMx} := -\cos\left(\frac{x}{y}\right) + \sin\left(\frac{y}{x}\right) + x \quad (14)$$

$$\text{DifIntMxy} := \text{diff}(\text{IntMx}, y)$$

$$\text{DifIntMxy} := \frac{\cos\left(\frac{y}{x}\right)}{x} - \frac{x \sin\left(\frac{x}{y}\right)}{y^2} \quad (15)$$

$$\text{Rest} := N - \text{DifIntMxy} \quad (16)$$

$$Rest := \frac{1}{y^2} \quad (16)$$

```
> SolucionGeneral := IntMx + int(Rest, y) = C1
```

$$SolucionGeneral := -\cos\left(\frac{x}{y}\right) + \sin\left(\frac{y}{x}\right) + x - \frac{1}{y} = C_1 \quad (17)$$

```
> Solucion := dsolve(Ecuacion)
```

Warning, computation interrupted

```
>
```