```
> restart
> SolucionGeneral := y(x) = C1·exp(2·x) + C2·cos(3·x) + C3·sin(3·x)
```

$$SolucionGeneral := y(x) = C_1 e^{2x} + C_2 \cos(3x) + C_3 \sin(3x) \quad (1)$$

```
> Sistema := diff(SolucionGeneral, x), diff(SolucionGeneral, x$2), diff(SolucionGeneral, x
  $3) : Sistema1; Sistema2; Sistema3;
```

$$\frac{d}{dx} y(x) = 2 C_1 e^{2x} - 3 C_2 \sin(3x) + 3 C_3 \cos(3x)$$

$$\frac{d^2}{dx^2} y(x) = 4 C_1 e^{2x} - 9 C_2 \cos(3x) - 9 C_3 \sin(3x)$$

$$\frac{d^3}{dx^3} y(x) = 8 C_1 e^{2x} + 27 C_2 \sin(3x) - 27 C_3 \cos(3x) \quad (2)$$

```
> Parametro := simplify(solve({Sistema}, {C1, C2, C3})) : Parametro1; Parametro2;
  Parametro3;
```

$$C_1 = \frac{1}{26} \left(\frac{d^3}{dx^3} y(x) + 9 \left(\frac{d}{dx} y(x) \right) \right) e^{-2x}$$

$$C_2 = \frac{2}{117} \cos(3x) \left(\frac{d^3}{dx^3} y(x) \right) + \frac{2}{13} \cos(3x) \left(\frac{d}{dx} y(x) \right) - \frac{1}{9} \cos(3x) \left(\frac{d^2}{dx^2} y(x) \right)$$
$$+ \frac{1}{39} \sin(3x) \left(\frac{d^3}{dx^3} y(x) \right) - \frac{4}{39} \left(\frac{d}{dx} y(x) \right) \sin(3x)$$

$$C_3 = \frac{2}{117} \sin(3x) \left(\frac{d^3}{dx^3} y(x) \right) + \frac{2}{13} \left(\frac{d}{dx} y(x) \right) \sin(3x) - \frac{1}{39} \cos(3x) \left(\frac{d^3}{dx^3} y(x) \right) \quad (3)$$
$$+ \frac{4}{39} \cos(3x) \left(\frac{d}{dx} y(x) \right) - \frac{1}{9} \left(\frac{d^2}{dx^2} y(x) \right) \sin(3x)$$

```
> EcuacionInicial := simplify(subs(C1 = rhs(Parametro1), C2 = rhs(Parametro2), C3
  = rhs(Parametro3), SolucionGeneral))
```

$$EcuacionInicial := y(x) = \frac{1}{18} \frac{d^3}{dx^3} y(x) + \frac{1}{2} \frac{d}{dx} y(x) - \frac{1}{9} \frac{d^2}{dx^2} y(x) \quad (4)$$

```
> EcuacionFinal := rhs(EcuacionInicial)·18 - lhs(EcuacionInicial)·18 = 0
```

$$EcuacionFinal := \frac{d^3}{dx^3} y(x) + 9 \left(\frac{d}{dx} y(x) \right) - 2 \left(\frac{d^2}{dx^2} y(x) \right) - 18 y(x) = 0 \quad (5)$$

```
> SolucionComprobatoria := dsolve(EcuacionFinal)
```

$$SolucionComprobatoria := y(x) = \_C1 e^{2x} + \_C2 \sin(3x) + \_C3 \cos(3x) \quad (6)$$

```
> SolucionGeneral;
```

$$y(x) = C_1 e^{2x} + C_2 \cos(3x) + C_3 \sin(3x) \quad (7)$$

```
> with(linalg) :
> WW := wronskian([exp(2 x), cos(3 x), sin(3 x)], x)
```

(8)

$$WW := \begin{bmatrix} e^{2x} & \cos(3x) & \sin(3x) \\ 2e^{2x} & -3\sin(3x) & 3\cos(3x) \\ 4e^{2x} & -9\cos(3x) & -9\sin(3x) \end{bmatrix} \quad (8)$$

> $comprobacion := simplify(det(WW)) \neq 0$

$$comprobacion := 39e^{2x} \neq 0 \quad (9)$$

>

>

>