```
> restart
> SolGral := y(x) = C1·exp(2·x) + C2·exp(-2·x) + C3·exp(3·x) + C4·exp(-3·x)
```

$$SolGral := y(x) = C_1 e^{2x} + C_2 e^{-2x} + C_3 e^{3x} + C_4 e^{-3x} \quad (1)$$

```
> Sistema := diff(SolGral, x), diff(SolGral, x$2), diff(SolGral, x$3), diff(SolGral, x$4) :
  Sistema1; Sistema2; Sistema3; Sistema4
```

$$\frac{d}{dx} y(x) = 2 C_1 e^{2x} - 2 C_2 e^{-2x} + 3 C_3 e^{3x} - 3 C_4 e^{-3x}$$

$$\frac{d^2}{dx^2} y(x) = 4 C_1 e^{2x} + 4 C_2 e^{-2x} + 9 C_3 e^{3x} + 9 C_4 e^{-3x}$$

$$\frac{d^3}{dx^3} y(x) = 8 C_1 e^{2x} - 8 C_2 e^{-2x} + 27 C_3 e^{3x} - 27 C_4 e^{-3x}$$

$$\frac{d^4}{dx^4} y(x) = 16 C_1 e^{2x} + 16 C_2 e^{-2x} + 81 C_3 e^{3x} + 81 C_4 e^{-3x} \quad (2)$$

```
> Parametro := solve( {Sistema}, {C1, C2, C3, C4} ) : Parametro1; Parametro2; Parametro3;
  Parametro4;
```

$$C_1 = \frac{1}{40} \frac{18\left(\frac{d}{dx} y(x)\right) - 2\left(\frac{d^3}{dx^3} y(x)\right) + 9\left(\frac{d^2}{dx^2} y(x)\right) - \left(\frac{d^4}{dx^4} y(x)\right)}{e^{2x}}$$

$$C_2 = -\frac{1}{40} \frac{18\left(\frac{d}{dx} y(x)\right) - 2\left(\frac{d^3}{dx^3} y(x)\right) - 9\left(\frac{d^2}{dx^2} y(x)\right) + \frac{d^4}{dx^4} y(x)}{e^{-2x}}$$

$$C_3 = -\frac{1}{90} \frac{12\left(\frac{d}{dx} y(x)\right) - 3\left(\frac{d^3}{dx^3} y(x)\right) + 4\left(\frac{d^2}{dx^2} y(x)\right) - \left(\frac{d^4}{dx^4} y(x)\right)}{e^{3x}}$$

$$C_4 = \frac{1}{90} \frac{12\left(\frac{d}{dx} y(x)\right) - 3\left(\frac{d^3}{dx^3} y(x)\right) - 4\left(\frac{d^2}{dx^2} y(x)\right) + \frac{d^4}{dx^4} y(x)}{e^{-3x}} \quad (3)$$

```
> EcuacionInicial := subs( C1 = rhs(Parametro1), C2 = rhs(Parametro2), C3
  = rhs(Parametro3), C4 = rhs(Parametro4), SolGral )
```

$$EcuacionInicial := y(x) = \frac{13}{36} \frac{d^2}{dx^2} y(x) - \frac{1}{36} \frac{d^4}{dx^4} y(x) \quad (4)$$

```
> EcuacionFinal := lhs(EcuacionInicial)·36 - rhs(EcuacionInicial)·36 = 0
```

$$EcuacionFinal := 36\, y(x) - 13\left(\frac{d^2}{dx^2} y(x)\right) + \frac{d^4}{dx^4} y(x) = 0 \quad (5)$$

```
> restart
> Ecuacion := y''' - 3 y'' + 3 y' - y = 0
```

$$Ecuacion := \frac{d^3}{dx^3} y(x) - 3\left(\frac{d^2}{dx^2} y(x)\right) + 3\left(\frac{d}{dx} y(x)\right) - y(x) = 0 \quad (6)$$

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

$$Solucion := y(x) = \_C1\, e^{x} + \_C2\, e^{x} x + \_C3\, e^{x} x^{2} \quad (7)$$

```
> restart
> Ecuacion := y''' + 6 y'' + 21 y' + 26 y = 0
```

$$Ecuacion := \frac{d^3}{dx^3} y(x) + 6\left(\frac{d^2}{dx^2} y(x)\right) + 21\left(\frac{d}{dx} y(x)\right) + 26\, y(x) = 0 \quad (8)$$

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

$$Solucion := y(x) = \_C1\, e^{-2x} + \_C2\, e^{-2x} \sin(3x) + \_C3\, e^{-2x} \cos(3x) \quad (9)$$

```
> restart
> EcuacCarac := expand((m - 5 I)··2·(m + 5 I)··2) = 0
```

$$EcuacCarac := m^4 + 625 + 50\, m^2 = 0 \quad (10)$$

```
> Ecuacion := y'''' + 50 y'' + 625 y = 0
```

$$Ecuacion := \frac{d^4}{dx^4} y(x) + 50\left(\frac{d^2}{dx^2} y(x)\right) + 625\, y(x) = 0 \quad (11)$$

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

$$SolucionGeneral := y(x) = \_C1 \sin(5x) + \_C2 \cos(5x) + \_C3 \sin(5x)\, x + \_C4 \cos(5x)\, x \quad (12)$$