```
> restart
>
```

$$y_g = C_1 + C_2 x + C_3 x^2 + C_4 e^x + C_5 e^{2x} + C_6 \operatorname{Sen}(2x) + C_7 \cos$$

orden = 5 EDO desconocida

```
> SolGral := y(x) = C1 + C2·x + C3·x··2 + C4·exp(x) + C5·exp(2 x) + C6·cos(2 x) + C7
      ·sin(2 x)
```

$$SolGral := y(x) = C_1 + C_2 x + C_3 x^2 + C_4 e^x + C_5 e^{2x} + C_6 \cos(2x) + C_7 \sin(2x) \quad (1)$$

```
> Sistema := SolGral, diff(SolGral, x), diff(SolGral, x$2), diff(SolGral, x$3), diff(SolGral, x
      $4), diff(SolGral, x$5), diff(SolGral, x$6) : Sistema1; Sistema2; Sistema3; Sistema4;
      Sistema5; Sistema6; Sistema7
```

$$y(x) = C_1 + C_2 x + C_3 x^2 + C_4 e^x + C_5 e^{2x} + C_6 \cos(2x) + C_7 \sin(2x)$$

$$\frac{d}{dx} y(x) = C_2 + 2 C_3 x + C_4 e^x + 2 C_5 e^{2x} - 2 C_6 \sin(2x) + 2 C_7 \cos(2x)$$

$$\frac{d^2}{dx^2} y(x) = 2 C_3 + C_4 e^x + 4 C_5 e^{2x} - 4 C_6 \cos(2x) - 4 C_7 \sin(2x)$$

$$\frac{d^3}{dx^3} y(x) = C_4 e^x + 8 C_5 e^{2x} + 8 C_6 \sin(2x) - 8 C_7 \cos(2x)$$

$$\frac{d^4}{dx^4} y(x) = C_4 e^x + 16 C_5 e^{2x} + 16 C_6 \cos(2x) + 16 C_7 \sin(2x)$$

$$\frac{d^5}{dx^5} y(x) = C_4 e^x + 32 C_5 e^{2x} - 32 C_6 \sin(2x) + 32 C_7 \cos(2x)$$

$$\frac{d^6}{dx^6} y(x) = C_4 e^x + 64 C_5 e^{2x} - 64 C_6 \cos(2x) - 64 C_7 \sin(2x) \quad (2)$$

```
> Parametro := simplify(solve({Sistema}, {C1, C2, C3, C4, C5, C6, C7})) : Parametro1;
      Parametro2; Parametro3; Parametro4; Parametro5; Parametro6; Parametro7;
```

$$C_1 = \frac{1}{16} x^2 \left(\frac{d^6}{dx^6} y(x)\right) + \frac{3}{16} \frac{d^6}{dx^6} y(x) - \frac{3}{2} \frac{d^3}{dx^3} y(x) + y(x) - \frac{3}{16} x^2 \left(\frac{d^5}{dx^5} y(x)\right)$$
$$- \frac{3}{4} \left(\frac{d^3}{dx^3} y(x)\right) x^2 + \frac{3}{8} x^2 \left(\frac{d^4}{dx^4} y(x)\right) - \frac{3}{8} \frac{d^5}{dx^5} y(x) + \frac{1}{2} \left(\frac{d^2}{dx^2} y(x)\right) x^2$$
$$+ \frac{11}{16} \frac{d^4}{dx^4} y(x) - x \left(\frac{d}{dx} y(x)\right) + \frac{3}{2} \left(\frac{d^3}{dx^3} y(x)\right) x + \frac{7}{16} x \left(\frac{d^5}{dx^5} y(x)\right)$$
$$- \frac{3}{4} x \left(\frac{d^4}{dx^4} y(x)\right) - \frac{3}{16} x \left(\frac{d^6}{dx^6} y(x)\right)$$

$$C_2 = \frac{d}{dx} y(x) - \frac{3}{2} \frac{d^3}{dx^3} y(x) - \frac{3}{4} x \left(\frac{d^4}{dx^4} y(x)\right) - \frac{1}{8} x \left(\frac{d^6}{dx^6} y(x)\right) + \frac{3}{8} x \left(\frac{d^5}{dx^5} y(x)\right)$$

$$+\frac{3}{2}\left(\frac{d^3}{dx^3}y(x)\right)x-\frac{7}{16}\frac{d^5}{dx^5}y(x)-\left(\frac{d^2}{dx^2}y(x)\right)x+\frac{3}{4}\frac{d^4}{dx^4}y(x)+\frac{3}{16}\frac{d^6}{dx^6}y(x)$$

$$C_3=\frac{1}{16}\frac{d^6}{dx^6}y(x)-\frac{3}{16}\frac{d^5}{dx^5}y(x)+\frac{3}{8}\frac{d^4}{dx^4}y(x)+\frac{1}{2}\frac{d^2}{dx^2}y(x)-\frac{3}{4}\frac{d^3}{dx^3}y(x)$$

$$C_4=-\frac{1}{5}\left(\frac{d^6}{dx^6}y(x)-8\left(\frac{d^3}{dx^3}y(x)\right)-2\left(\frac{d^5}{dx^5}y(x)\right)+4\left(\frac{d^4}{dx^4}y(x)\right)\right)e^{-x}$$

$$C_5=\frac{1}{64}\left(-\left(\frac{d^5}{dx^5}y(x)\right)-4\left(\frac{d^3}{dx^3}y(x)\right)+4\left(\frac{d^4}{dx^4}y(x)\right)+\frac{d^6}{dx^6}y(x)\right)e^{-2x}$$

$$C_6=-\frac{3}{320}\cos(2x)\left(\frac{d^5}{dx^5}y(x)\right)-\frac{3}{80}\cos(2x)\left(\frac{d^3}{dx^3}y(x)\right)+\frac{1}{20}\cos(2x)\left(\frac{d^4}{dx^4}y(x)\right)$$
$$-\frac{1}{320}\left(\frac{d^6}{dx^6}y(x)\right)\cos(2x)-\frac{11}{320}\sin(2x)\left(\frac{d^5}{dx^5}y(x)\right)$$
$$-\frac{1}{80}\sin(2x)\left(\frac{d^3}{dx^3}y(x)\right)+\frac{3}{80}\sin(2x)\left(\frac{d^4}{dx^4}y(x)\right)+\frac{3}{320}\left(\frac{d^6}{dx^6}y(x)\right)\sin(2x)$$

$$C_7=-\frac{3}{320}\sin(2x)\left(\frac{d^5}{dx^5}y(x)\right)-\frac{3}{80}\sin(2x)\left(\frac{d^3}{dx^3}y(x)\right)+\frac{1}{20}\sin(2x)\left(\frac{d^4}{dx^4}y(x)\right) \quad (3)$$
$$+\frac{11}{320}\cos(2x)\left(\frac{d^5}{dx^5}y(x)\right)+\frac{1}{80}\cos(2x)\left(\frac{d^3}{dx^3}y(x)\right)-\frac{3}{80}\cos(2x)\left(\frac{d^4}{dx^4}y(x)\right)$$
$$-\frac{1}{320}\left(\frac{d^6}{dx^6}y(x)\right)\sin(2x)-\frac{3}{320}\left(\frac{d^6}{dx^6}y(x)\right)\cos(2x)$$

```
> EcuacionInicial := simplify(eval(subs(C[1]=rhs(Parametro[1]), C[2]=rhs(Parametro[2]), C[3]
    =rhs(Parametro[3]), C[4]=rhs(Parametro[4]), C[5]=rhs(Parametro[5]), C[6]
    =rhs(Parametro[6]), C[7]=rhs(Parametro[7]), diff(SolGral, x$7))))
```

$$EcuacionInicial:=\frac{d^7}{dx^7}y(x)=3\left(\frac{d^6}{dx^6}y(x)\right)-8\left(\frac{d^3}{dx^3}y(x)\right)-6\left(\frac{d^5}{dx^5}y(x)\right) \quad (4)$$
$$+12\left(\frac{d^4}{dx^4}y(x)\right)$$

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

$$EcuacionFinal:=\frac{d^7}{dx^7}y(x)-3\left(\frac{d^6}{dx^6}y(x)\right)+8\left(\frac{d^3}{dx^3}y(x)\right)+6\left(\frac{d^5}{dx^5}y(x)\right) \quad (5)$$
$$-12\left(\frac{d^4}{dx^4}y(x)\right)=0$$

```
>
```