```
> restart
> SolUno := y(x) = exp(2 x)·cos(5 x)
```

$$SolUno := y(x) = e^{2x}\cos(5x) \tag{1}$$

```
> SolDos := y(x) = exp(2 x)·sin(5 x)
```

$$SolDos := y(x) = e^{2x}\sin(5x) \tag{2}$$

```
> with(linalg) :
> WW := wronskian([rhs(SolUno), rhs(SolDos)], x)
```

$$WW := \begin{bmatrix} e^{2x}\cos(5x) & e^{2x}\sin(5x) \\ 2\,e^{2x}\cos(5x) - 5\,e^{2x}\sin(5x) & 2\,e^{2x}\sin(5x) + 5\,e^{2x}\cos(5x) \end{bmatrix} \tag{3}$$

```
> Linealidad := simplify(det(WW)) ≠ 0
```

$$Linealidad := 5\,e^{4x} \neq 0 \tag{4}$$

```
> SolGral := y(x) = C1·rhs(SolUno) + C2·rhs(SolDos)
```

$$SolGral := y(x) = C_1\,e^{2x}\cos(5x) + C_2\,e^{2x}\sin(5x) \tag{5}$$

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

$$\frac{d}{dx}y(x) = 2\,C_1\,e^{2x}\cos(5x) - 5\,C_1\,e^{2x}\sin(5x) + 2\,C_2\,e^{2x}\sin(5x) + 5\,C_2\,e^{2x}\cos(5x)$$

$$\frac{d^2}{dx^2}y(x) = -21\,C_1\,e^{2x}\cos(5x) - 20\,C_1\,e^{2x}\sin(5x) - 21\,C_2\,e^{2x}\sin(5x) + 20\,C_2\,e^{2x}\cos(5x) \tag{6}$$

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

$$C_1 = -\frac{1}{145}\,e^{-2x}\left(5\left(\frac{d^2}{dx^2}y(x)\right)\cos(5x) - 20\left(\frac{d}{dx}y(x)\right)\cos(5x) + 2\left(\frac{d^2}{dx^2}y(x)\right)\sin(5x) + 21\left(\frac{d}{dx}y(x)\right)\sin(5x)\right)$$

$$C_2 = \frac{1}{145}\,e^{-2x}\left(2\left(\frac{d^2}{dx^2}y(x)\right)\cos(5x) - 5\left(\frac{d^2}{dx^2}y(x)\right)\sin(5x) + 21\left(\frac{d}{dx}y(x)\right)\cos(5x) + 20\left(\frac{d}{dx}y(x)\right)\sin(5x)\right) \tag{7}$$

```
> EcuacionUno := simplify(subs(C1 = rhs(Parametro1), C2 = rhs(Parametro2), SolGral))
```

$$EcuacionUno := y(x) = -\frac{1}{29}\frac{d^2}{dx^2}y(x) + \frac{4}{29}\frac{d}{dx}y(x) \tag{8}$$

```
> EcuacionFinal := simplify(lhs(EcuacionUno)·29 - rhs(EcuacionUno)·29) = 0
```

$$EcuacionFinal := 29\,y(x) + \frac{d^2}{dx^2}y(x) - 4\left(\frac{d}{dx}y(x)\right) = 0 \tag{9}$$

```
> Raiz1 := 2 + 5·I; Raiz2 := 2 - 5·I
```

$$Raiz_1 := 2 + 5\,I$$

$$Raiz_2 := 2 - 5\,I \tag{10}$$

```
> EcuacionCaracteristica := expand((m - Raiz1)·(m - Raiz2)) = 0
```

$$EcuacionCaracteristica := m^2 - 4\,m + 29 = 0 \quad \textbf{(11)}$$

>