```
> restart
> Ecua := y'= 0
```

$$Ecua := \frac{d}{dx}\, y(x) = 0 \tag{1}$$

```
> SolGral := dsolve(Ecua)
```

$$SolGral := y(x) = \_C1 \tag{2}$$

```
> EcuaDos := y''''= 0
```

$$EcuaDos := \frac{d^4}{dx^4}\, y(x) = 0 \tag{3}$$

```
> SolGralDos := dsolve(EcuaDos)
```

$$SolGralDos := y(x) = \frac{1}{6}\,\_C1\, x^3 + \frac{1}{2}\,\_C2\, x^2 + \_C3\, x + \_C4 \tag{4}$$

```
> restart
> Ecuacion := y'' + 2 y' + 2 y = 0
```

$$Ecuacion := \frac{d^2}{dx^2}\, y(x) + 2\left(\frac{d}{dx}\, y(x)\right) + 2\, y(x) = 0 \tag{5}$$

```
> EcuaCarc := m^2 + 2 m + 2 = 0
```

$$EcuaCarc := m^2 + 2\, m + 2 = 0 \tag{6}$$

```
> Raiz := solve(EcuaCarc)
```

$$Raiz := -1 + I, -1 - I \tag{7}$$

```
> SolGral := y(x) = _C1·exp(Re(Raiz[1])·x)·cos(Im(Raiz[1])·x) + _C2·exp(Re(Raiz[1])·x)
      ·sin(Im(Raiz[1])·x)
```

$$SolGral := y(x) = \_C1\, e^{-x} \cos(x) + \_C2\, e^{-x} \sin(x) \tag{8}$$

```
> with(linalg) :
>
> yy[1] := exp(Re(Raiz[1])·x)·cos(Im(Raiz[1])·x); yy[2] := exp(Re(Raiz[1])·x)
      ·sin(Im(Raiz[1])·x)
```

$$yy_1 := e^{-x} \cos(x)$$

$$yy_2 := e^{-x} \sin(x) \tag{9}$$

```
> WW := wronskian([yy[1], yy[2]], x)
```

$$WW := \begin{bmatrix} e^{-x}\cos(x) & e^{-x}\sin(x) \\ -e^{-x}\cos(x) - e^{-x}\sin(x) & -e^{-x}\sin(x) + e^{-x}\cos(x) \end{bmatrix} \tag{10}$$

```
> simplify(det(WW)) ≠ 0
```

$$e^{-2x} \neq 0 \tag{11}$$

```
> Ecuacion
```

$$\frac{d^2}{dx^2}\, y(x) + 2\left(\frac{d}{dx}\, y(x)\right) + 2\, y(x) = 0 \tag{12}$$

```
> rhs(SolGral)
```

$$\_C1\, e^{-x} \cos(x) + \_C2\, e^{-x} \sin(x) \tag{13}$$

```
> Comprobar := eval(subs(y(x) = rhs(SolGral), Ecuacion))
```

$$\tag{14}$$

$$Comprobar := 0 = 0 \tag{14}$$

> *restart*

> $Ecua := y''' - 9\,y'' + 31\,y' - 39\,y = 0$

$$Ecua := \frac{d^3}{dx^3}\,y(x) - 9\left(\frac{d^2}{dx^2}\,y(x)\right) + 31\left(\frac{d}{dx}\,y(x)\right) - 39\,y(x) = 0 \tag{15}$$

> $SolGral := dsolve(Ecua)$

$$SolGral := y(x) = \_C1\,e^{3x} + \_C2\,e^{3x}\sin(2\,x) + \_C3\,e^{3x}\cos(2\,x) \tag{16}$$

> *restart*

> $Ecua := y'''' - 8\,y''' + 42\,y'' - 104\,y' + 169\,y = 0$

$$Ecua := \frac{d^4}{dx^4}\,y(x) - 8\left(\frac{d^3}{dx^3}\,y(x)\right) + 42\left(\frac{d^2}{dx^2}\,y(x)\right) - 104\left(\frac{d}{dx}\,y(x)\right) + 169\,y(x) = 0 \tag{17}$$

> $SolGral := dsolve(Ecua)$

$$SolGral := y(x) = \_C1\,e^{2x}\sin(3\,x) + \_C2\,e^{2x}\cos(3\,x) + \_C3\,e^{2x}\sin(3\,x)\,x$$
$$+ \_C4\,e^{2x}\cos(3\,x)\,x \tag{18}$$

>