```
> restart
> Ecuacion := y'' + y' + y = 0
```
$$Ecuacion := \frac{d^2}{dx^2} y(x) + \frac{d}{dx} y(x) + y(x) = 0 \tag{1}$$

```
> EcuacionCaracteristica := m··2 + m + 1 = 0
```
$$EcuacionCaracteristica := m^2 + m + 1 = 0 \tag{2}$$

```
> Raiz := solve(EcuacionCaracteristica)
```
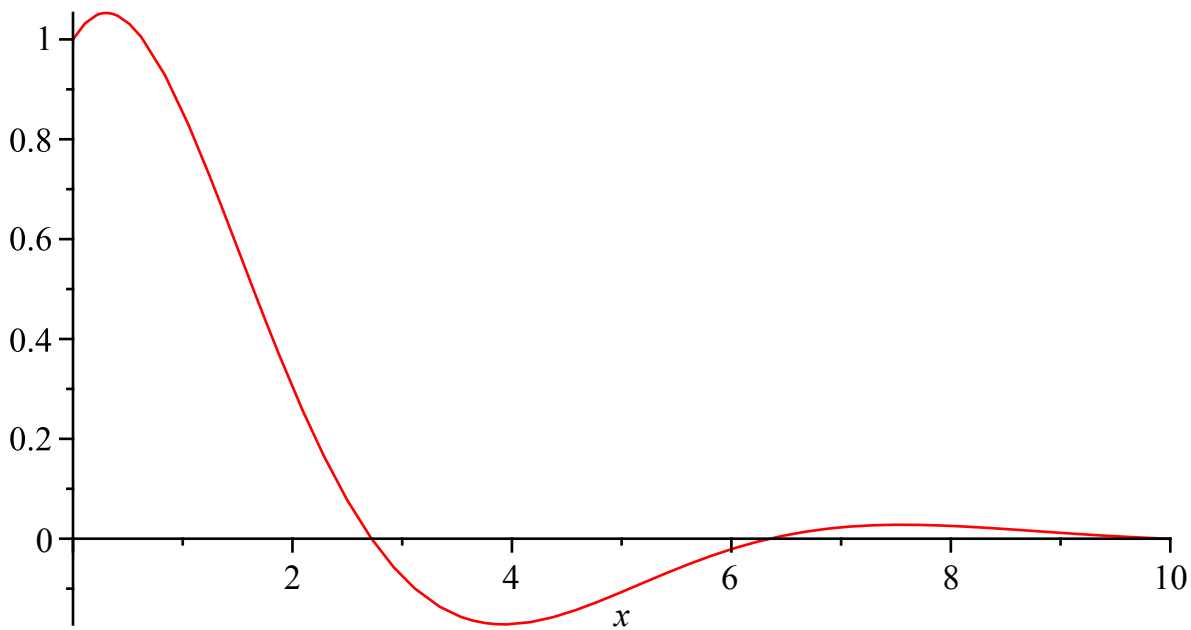$$Raiz := -\frac{1}{2} + \frac{1}{2} I \sqrt{3}, \ -\frac{1}{2} - \frac{1}{2} I \sqrt{3} \tag{3}$$

```
> SolGralIncomoda := y(x) = C_1·exp(Raiz_1·x) + C_2·exp(Raiz_2·x)
```
$$SolGralIncomoda := y(x) = C_1 e^{\left(-\frac{1}{2} + \frac{1}{2} I\sqrt{3}\right)x} + C_2 e^{\left(-\frac{1}{2} - \frac{1}{2} I\sqrt{3}\right)x} \tag{4}$$

```
> SolGralComoda := y(x) = C_1·exp(Re(Raiz_1)·x)·cos(Im(Raiz_1)·x) + C_2·exp(Re(Raiz_1)
     ·x)·sin(Im(Raiz_1)·x) : evalf(%, 4)
```
$$y(x) = C_1 e^{-0.5000 x} \cos(0.8660 x) + C_2 e^{-0.5000 x} \sin(0.8660 x) \tag{5}$$

```
> plot(subs(C_1 = 1, C_2 = 1, rhs(SolGralComoda)), x = 0..10)
```



```
> SolucionGeneral := dsolve(Ecuacion) : evalf(%, 4)
```
$$y(x) = \_C1 \ e^{-0.5000 x} \sin(0.8660 x) + \_C2 \ e^{-0.5000 x} \cos(0.8660 x) \tag{6}$$

```
> evalf(SolGralComoda, 4);
```
$$y(x) = C_1 e^{-0.5000 x} \cos(0.8660 x) + C_2 e^{-0.5000 x} \sin(0.8660 x) \tag{7}$$

```
> restart
> Ecuacion := y'' + 27 y = 0
```
$$Ecuacion := \frac{d^2}{dx^2} y(x) + 27 y(x) = 0 \tag{8}$$

```
> SolucionGeneral := dsolve(Ecuacion) : evalf(%, 4)
```

$$y(x) = \_C1\,\sin(5.196\,x) + \_C2\,\cos(5.196\,x) \tag{9}$$

```
> restart
> SolUno := y(x) = exp(m₁·x); SolDos := y(x) = x·exp(m₁·x)
```

$$SolUno := y(x) = e^{m_1 x}$$

$$SolDos := y(x) = x\,e^{m_1 x} \tag{10}$$

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

$$WW := \begin{bmatrix} e^{m_1 x} & x\,e^{m_1 x} \\ m_1\,e^{m_1 x} & e^{m_1 x} + x\,m_1\,e^{m_1 x} \end{bmatrix} \tag{11}$$

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

$$demostracion := e^{2\,m_1 x} \neq 0 \tag{12}$$

```
> restart
> Ecuacion := y'' - 6·y' + 9·y = 0
```

$$Ecuacion := \frac{d^2}{dx^2}\,y(x) - 6\left(\frac{d}{dx}\,y(x)\right) + 9\,y(x) = 0 \tag{13}$$

```
> EcuaCaract := m··2 - 6·m + 9 = 0
```

$$EcuaCaract := m^2 - 6\,m + 9 = 0 \tag{14}$$

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

$$Raiz := 3, 3 \tag{15}$$

```
> SolGral := y(x) = C₁·exp(Raiz₁·x) + C₂·x·exp(Raiz₁·x)
```

$$SolGral := y(x) = C_1\,e^{3x} + C_2\,x\,e^{3x} \tag{16}$$

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

$$comprobacion := 0 = 0 \tag{17}$$

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

$$SolucionGeneral := y(x) = \_C1\,e^{3x} + \_C2\,e^{3x}\,x \tag{18}$$

```
>
>
>
>
```