

```

> restart
LA ECUACIÓN DIFERENCIAL ORDINARIA (SEGUNDO ORDEN) LINEAL coeficientes
constantes Homogénea.
> Ecuacion := diff(y(x), x$2) - 5·diff(y(x), x) + 6·y(x) = 0;
      Ecuacion :=  $\frac{d^2}{dx^2} y(x) - 5 \left( \frac{d}{dx} y(x) \right) + 6 y(x) = 0$  (1)
> Caracteristica := m·2 - 5·m + 6 = 0;
      Caracteristica :=  $m^2 - 5 m + 6 = 0$  (2)
> raiz := solve(Caracteristica);
      raiz := 3, 2 (3)
> Solucion1 := exp(raiz1·x); Solucion2 := exp(raiz2·x);
      Solucion1 :=  $e^{3x}$ 
      Solucion2 :=  $e^{2x}$  (4)
> with(linalg) :
> WW := wronskian([Solucion1, Solucion2], x);
      WW :=  $\begin{bmatrix} e^{3x} & e^{2x} \\ 3 e^{3x} & 2 e^{2x} \end{bmatrix}$  (5)
> comprobacion1 := det(WW) ≠ 0;
      comprobacion1 :=  $-e^{3x} e^{2x} \neq 0$  (6)
> SolucionGeneral := y(x) = C1·Solucion1 + C2·Solucion2;
      SolucionGeneral :=  $y(x) = C1 e^{3x} + C2 e^{2x}$  (7)
> SolGral := dsolve(Ecuacion);
      SolGral :=  $y(x) = \_C1 e^{3x} + \_C2 e^{2x}$  (8)
> comprobacion2 := simplify(eval(subs(y(x) = rhs(SolucionGeneral), Ecuacion)));
      comprobacion2 :=  $0 = 0$  (9)
> restart :
> Ecuacion := y'' - 2 y' + 2 y = 0;
      Ecuacion :=  $\frac{d^2}{dx^2} y(x) - 2 \left( \frac{d}{dx} y(x) \right) + 2 y(x) = 0$  (10)
> Solucion := dsolve(Ecuacion);
      Solucion :=  $y(x) = \_C1 e^x \sin(x) + \_C2 e^x \cos(x)$  (11)
> restart
> SolucionGeneral := y(x) = C1·cos(sqrt(27)·x) + C2·sin(sqrt(27)·x);
      SolucionGeneral :=  $y(x) = C1 \cos(3 \sqrt{3} x) + C2 \sin(3 \sqrt{3} x)$  (12)
> sistema := diff(SolucionGeneral, x), diff(SolucionGeneral, x$2) :
> SOL := solve({sistema}, {C1, C2});
      SOL :=  $\left\{ C1 = -\frac{1}{81} \sqrt{3} \left( 9 \left( \frac{d}{dx} y(x) \right) \sin(3 \sqrt{3} x) + \cos(3 \sqrt{3} x) \sqrt{3} \left( \frac{d^2}{dx^2} y(x) \right) \right), C2 \right.$  (13)

```

$$= \frac{1}{9} \sqrt{3} \cos(3 \sqrt{3} x) \left(\frac{d}{dx} y(x) \right) - \frac{1}{27} \left(\frac{d^2}{dx^2} y(x) \right) \sin(3 \sqrt{3} x) \Big\}$$

> *EcuacionInicial* := simplify(eval(subs(C1 = rhs(SOL₁), C2 = rhs(SOL₂),
SolucionGeneral)))

$$\textit{EcuacionInicial} := y(x) = - \frac{1}{27} \frac{d^2}{dx^2} y(x) \quad (14)$$

> *EcuacionFinal* := lhs(*EcuacionInicial*) · 27 − rhs(*EcuacionInicial*) · 27 = 0

$$\textit{EcuacionFinal} := 27 y(x) + \frac{d^2}{dx^2} y(x) = 0 \quad (15)$$

>