

$$\begin{aligned} &> \text{restart} \\ &> \text{SolucionGeneral} := y(t) = C_1 \cdot \cos(2 \cdot t) + C_2 \cdot \sin(2 \cdot t) \\ &\quad \text{SolucionGeneral} := y(t) = C_1 \cos(2 t) + C_2 \sin(2 t) \end{aligned} \quad (1)$$

$$\begin{aligned} &> \text{Sistema} := \text{diff}(\text{SolucionGeneral}, t), \text{diff}(\text{SolucionGeneral}, t\$2) : \text{Sistema}_1; \text{Sistema}_2; \\ &\quad \frac{d}{dt} y(t) = -2 C_1 \sin(2 t) + 2 C_2 \cos(2 t) \\ &\quad \frac{d^2}{dt^2} y(t) = -4 C_1 \cos(2 t) - 4 C_2 \sin(2 t) \end{aligned} \quad (2)$$

$$\begin{aligned} &> \text{Parametro} := \text{simplify}(\text{solve}(\{\text{Sistema}\}, \{C_1, C_2\})) : \text{Parametro}_1; \text{Parametro}_2; \\ &\quad C_1 = -\frac{1}{4} \cos(2 t) \left(\frac{d^2}{dt^2} y(t) \right) - \frac{1}{2} \left(\frac{d}{dt} y(t) \right) \sin(2 t) \\ &\quad C_2 = -\frac{1}{4} \left(\frac{d^2}{dt^2} y(t) \right) \sin(2 t) + \frac{1}{2} \left(\frac{d}{dt} y(t) \right) \cos(2 t) \end{aligned} \quad (3)$$

$$\begin{aligned} &> \text{EcuacionIntermedia} := \text{simplify}(\text{subs}(C_1 = \text{rhs}(\text{Parametro}_1), C_2 = \text{rhs}(\text{Parametro}_2), \\ &\quad \text{SolucionGeneral})) \\ &\quad \text{EcuacionIntermedia} := y(t) = -\frac{1}{4} \frac{d^2}{dt^2} y(t) \end{aligned} \quad (4)$$

$$\begin{aligned} &> \text{EcuacionFinal} := \text{lhs}(\text{EcuacionIntermedia}) \cdot 4 - \text{rhs}(\text{EcuacionIntermedia}) \cdot 4 = 0 \\ &\quad \text{EcuacionFinal} := 4 y(t) + \frac{d^2}{dt^2} y(t) = 0 \end{aligned} \quad (5)$$

$$\begin{aligned} &> \text{SolucionGeneral}; \\ &\quad y(t) = C_1 \cos(2 t) + C_2 \sin(2 t) \end{aligned} \quad (6)$$

$$\begin{aligned} &> \text{Comprobacion}_1 := \text{simplify}(\text{eval}(\text{subs}(y(t) = \text{rhs}(\text{SolucionGeneral}), \text{EcuacionFinal}))) \\ &\quad \text{Comprobacion}_1 := 0 = 0 \end{aligned} \quad (7)$$

$$\begin{aligned} &> \text{SolucionGeneralUno} := y(t) = C_1 \cdot \tan(2 \cdot t) + C_2 \cdot \cot(2 \cdot t) \\ &\quad \text{SolucionGeneralUno} := y(t) = C_1 \tan(2 t) + C_2 \cot(2 t) \end{aligned} \quad (8)$$

$$\begin{aligned} &> \text{Comprobacion}_2 := \text{simplify}(\text{eval}(\text{subs}(y(t) = \text{rhs}(\text{SolucionGeneralUno}), \text{EcuacionFinal}))) \\ &\quad \text{Comprobacion}_2 := \frac{4 \left(-C_2 \cos(2 t)^6 + 3 C_2 \cos(2 t)^4 - 3 C_1 \cos(2 t)^2 + 2 C_1 + \cos(2 t)^6 C_1 \right)}{\cos(2 t)^3 \sin(2 t)^3} \\ &\quad = 0 \end{aligned} \quad (9)$$

$$\begin{aligned} &> \text{SolucionParticularUno} := \text{subs}(C_1 = -3, C_2 = 5, \text{SolucionGeneral}) \\ &\quad \text{SolucionParticularUno} := y(t) = -3 \cos(2 t) + 5 \sin(2 t) \end{aligned} \quad (10)$$

$$\begin{aligned} &> \text{Comprobacion}_3 := \text{simplify}(\text{eval}(\text{subs}(y(t) = \text{rhs}(\text{SolucionParticularUno}), \text{EcuacionFinal}))) \\ &\quad \text{Comprobacion}_3 := 0 = 0 \end{aligned} \quad (11)$$

$$\begin{aligned} &> \text{SolucionParticularDos} := y(t) = \cos(2 t) \\ &\quad \text{SolucionParticularDos} := y(t) = \cos(2 t) \end{aligned} \quad (12)$$

$$\begin{aligned} &> \text{Comprobacion}_1 := \text{simplify}(\text{eval}(\text{subs}(y(t) = \text{rhs}(\text{SolucionParticularDos}), \text{EcuacionFinal}))) \\ &\quad \text{Comprobacion}_1 := 0 = 0 \end{aligned} \quad (13)$$

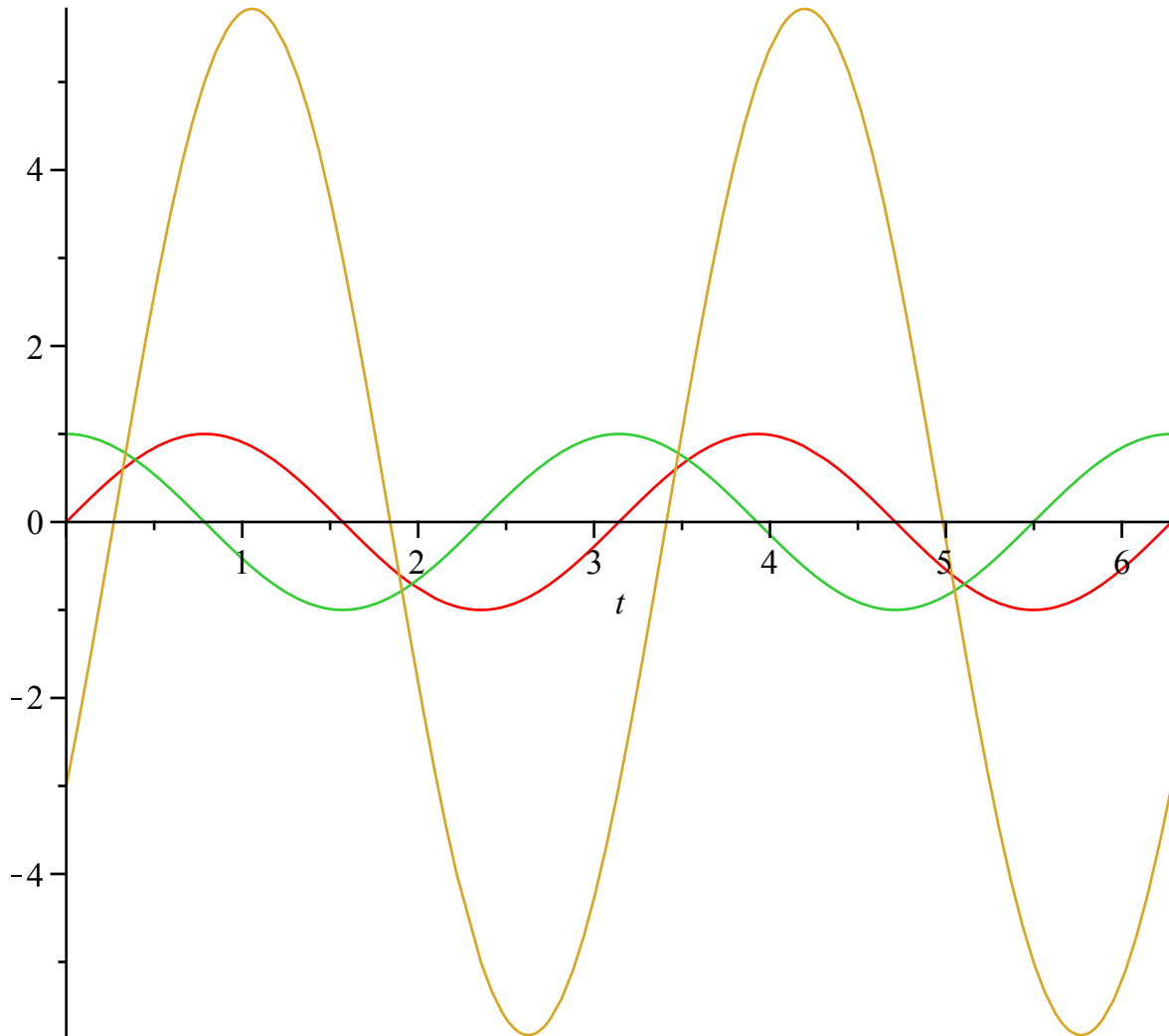
$$\text{Comprobacion}_1 := 0 = 0 \quad (13)$$

$$\begin{aligned} &> \text{SolucionParticularTres} := y(t) = \sin(2t) \\ &\quad \text{SolucionParticularTres} := y(t) = \sin(2t) \end{aligned} \quad (14)$$

$$\begin{aligned} &> \text{Comprobacion}_4 := \text{simplify}(\text{eval}(\text{subs}(y(t) = \text{rhs}(\text{SolucionParticularTres}), \text{EcuacionFinal}))) \\ &\quad \text{Comprobacion}_4 := 0 = 0 \end{aligned} \quad (15)$$

$$\begin{aligned} &> \text{SolucionGeneral} \\ &\quad y(t) = C_1 \cos(2t) + C_2 \sin(2t) \end{aligned} \quad (16)$$

$$> \text{plot}([\text{rhs}(\text{SolucionParticularTres}), \text{rhs}(\text{SolucionParticularDos}), \text{rhs}(\text{SolucionParticularUno})], t = 0 .. 2 \cdot \text{Pi})$$



$$\begin{aligned} &> \text{plot}([\text{subs}(C_1 = 6, C_2 = -6, \text{rhs}(\text{SolucionGeneral})), \text{subs}(C_1 = 5, C_2 = -5, \\ &\quad \text{rhs}(\text{SolucionGeneral})), \text{subs}(C_1 = 1, C_2 = -1, \text{rhs}(\text{SolucionGeneral})), \text{subs}(C_1 = 2, C_2 = \\ &\quad -2, \text{rhs}(\text{SolucionGeneral})), \text{subs}(C_1 = 3, C_2 = -3, \text{rhs}(\text{SolucionGeneral})), \text{subs}(C_1 = 4, \\ &\quad C_2 = -4, \text{rhs}(\text{SolucionGeneral})), \text{subs}(C_1 = -6, C_2 = 6, \text{rhs}(\text{SolucionGeneral})), \text{subs}(C_1 = \\ &\quad -5, C_2 = 5, \text{rhs}(\text{SolucionGeneral})), \text{subs}(C_1 = -1, C_2 = 1, \text{rhs}(\text{SolucionGeneral})), \\ &\quad \text{subs}(C_1 = -2, C_2 = 2, \text{rhs}(\text{SolucionGeneral})), \text{subs}(C_1 = -3, C_2 = 3, \\ &\quad \text{rhs}(\text{SolucionGeneral})), \text{subs}(C_1 = -4, C_2 = 4, \text{rhs}(\text{SolucionGeneral}))], t = 0 .. 2 \cdot \text{Pi}) \end{aligned}$$

