> *restart*

Cuando no hay Resonancia

> $Ecuacion := diff(y(t), t\$2) + 11 \cdot y(t) = 10 \cdot \sin(3\,t)$

$$Ecuacion := \frac{d^2}{dt^2}\,y(t) + 11\,y(t) = 10\,\sin(3\,t) \tag{1}$$

> $SolucionGeneral := dsolve(Ecuacion)$

$$SolucionGeneral := y(t) = \sin\left(\sqrt{11}\,t\right)\_C2 + \cos\left(\sqrt{11}\,t\right)\_C1 + 5\,\sin(3\,t) \tag{2}$$

> $Condiciones := y(0) = 0, D(y)(0) = 0$
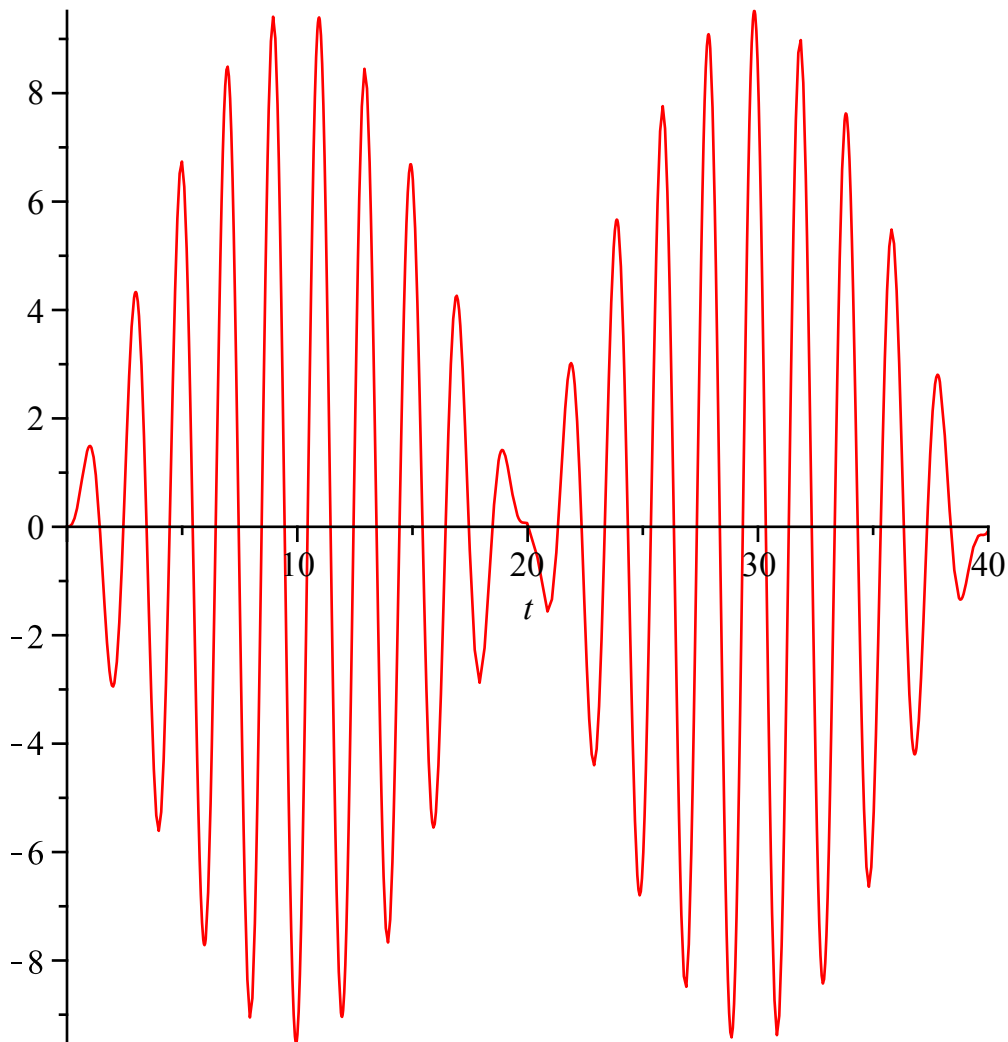
$$Condiciones := y(0) = 0, D(y)(0) = 0 \tag{3}$$

> $SolucionParticular := dsolve(\{Ecuacion, Condiciones\})$

$$SolucionParticular := y(t) = -\frac{15}{11}\,\sin\left(\sqrt{11}\,t\right)\sqrt{11} + 5\,\sin(3\,t) \tag{4}$$

> $DerSolucionParticular := diff(SolucionParticular, t)$

$$DerSolucionParticular := \frac{d}{dt}\,y(t) = -15\,\cos\left(\sqrt{11}\,t\right) + 15\,\cos(3\,t) \tag{5}$$

> $plot(rhs(SolucionParticular), t = 0..40)$

Cuando si hay Resonancia

> $Ecuacion := diff(y(t), t\$2) + 9 \cdot y(t) = 10 \cdot \sin(3\,t)$

$$Ecuacion := \frac{d^2}{dt^2}\,y(t) + 9\,y(t) = 10\,\sin(3\,t) \tag{6}$$

> $SolucionGeneral := dsolve(Ecuacion)$

$$SolucionGeneral := y(t) = \sin(3\,t)\,\_C2 + \cos(3\,t)\,\_C1 - \frac{5}{3}\,\cos(3\,t)\,t \tag{7}$$

> $Condiciones := y(0) = 0, D(y)(0) = 0$
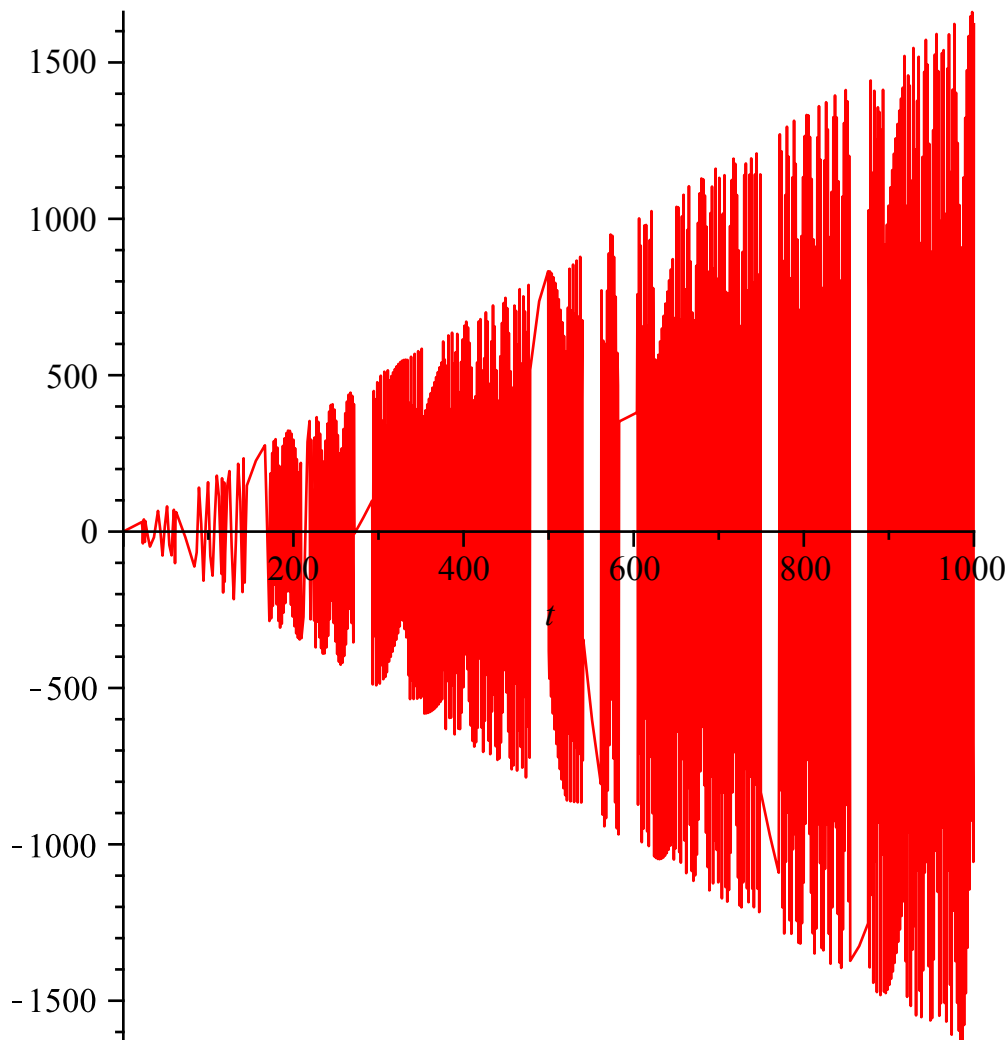
$$Condiciones := y(0) = 0, D(y)(0) = 0 \tag{8}$$

> $SolucionParticular := dsolve(\{Ecuacion, Condiciones\})$

$$SolucionParticular := y(t) = \frac{5}{9}\,\sin(3\,t) - \frac{5}{3}\,\cos(3\,t)\,t \tag{9}$$

> $DerSolucionParticular := diff(SolucionParticular, t)$

$$DerSolucionParticular := \frac{d}{dt}\,y(t) = 5\,\sin(3\,t)\,t \tag{10}$$

> $plot(rhs(SolucionParticular), t = 0\,..1000)$

Cuando no hay Resonancia a mayor frecuencia

> $Ecuacion := diff(y(t), t\$2) + 9 \cdot y(t) = 10 \cdot \sin(4\,t)$

$$\tag{11}$$

$$Ecuacion := \frac{d^2}{dt^2} y(t) + 9 \, y(t) = 10 \sin(4 \, t) \tag{11}$$

> $SolucionGeneral := dsolve(Ecuacion)$

$$SolucionGeneral := y(t) = \sin(3 \, t) \, \_C2 + \cos(3 \, t) \, \_C1 - \frac{10}{7} \sin(4 \, t) \tag{12}$$

> $Condiciones := y(0) = 0, D(y)(0) = 0$
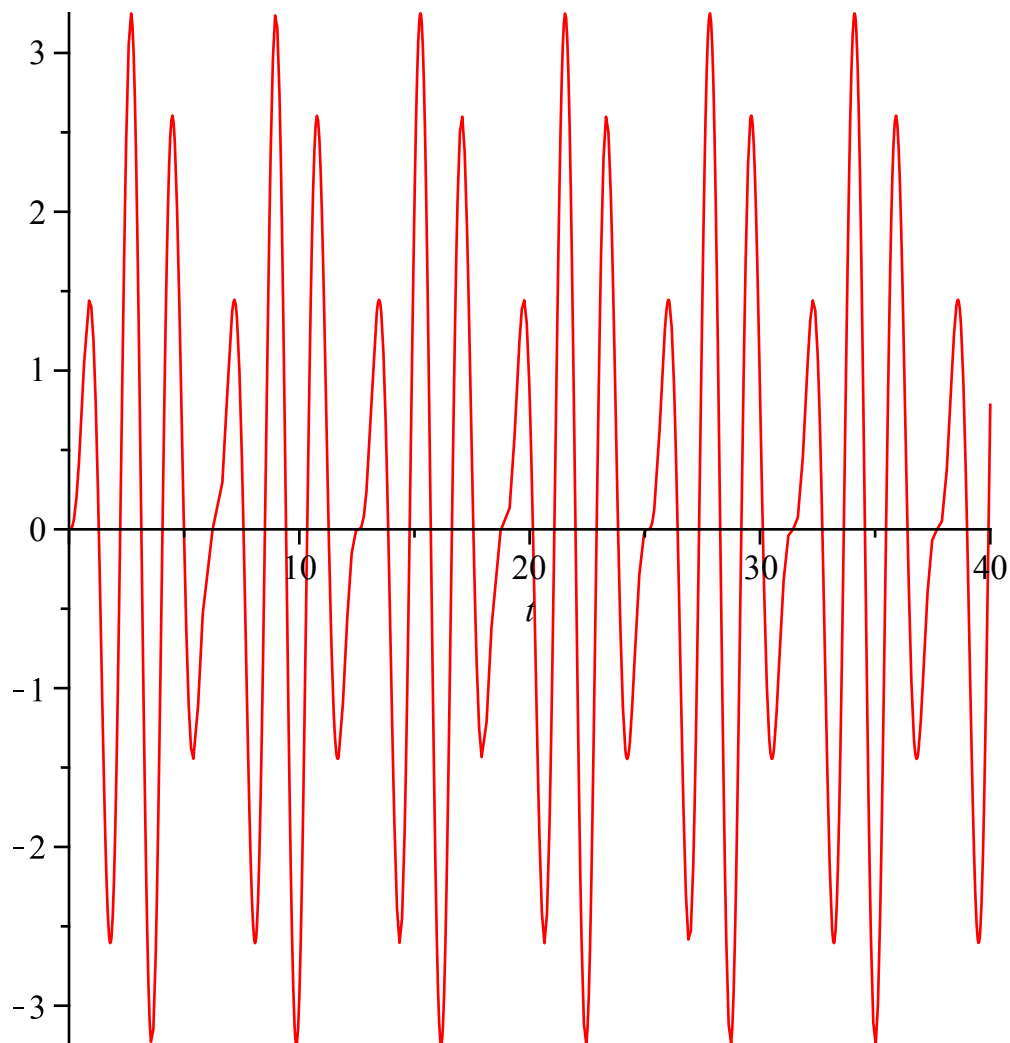
$$Condiciones := y(0) = 0, D(y)(0) = 0 \tag{13}$$

> $SolucionParticular := dsolve(\{Ecuacion, Condiciones\})$

$$SolucionParticular := y(t) = \frac{40}{21} \sin(3 \, t) - \frac{10}{7} \sin(4 \, t) \tag{14}$$

> $DerSolucionParticular := diff(SolucionParticular, t)$

$$DerSolucionParticular := \frac{d}{dt} y(t) = \frac{40}{7} \cos(3 \, t) - \frac{40}{7} \cos(4 \, t) \tag{15}$$

> $plot(rhs(SolucionParticular), t = 0..40)$